STATE OF CALIFORNIA PETE WILSON, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
2101 WEBSTER STREET, SUITE 500
OAKLAND, CA 94612
(510) 286-1255

Date: SEP 22 1994
File No. 2189.8063A(jmh)

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Hewlett-Packard
1501 Page Mill Road (MS 5UE)
Palo Alto, CA 94303

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Stanford Management Company
2770 Sand Hill Road
Menlo Park, CA 94025

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Varian Associates
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Palo Alto, CA 94304-1030

Subject: Adopted Final Site Cleanup Requirements for Hewlett-Packard 640, 395 Page Mill Road and Varian 601 California Avenue, Santa Clara County

Dear Ms. Ross, Kakimoto and Mr Gustincic:

The Regional Water Quality Control Board, San Francisco Bay Region, adopted Final Site Cleanup Requirements Order No. 94-130 for the subject sites, at its September 21 meeting. Enclosed is a copy of the adopted Order.

Please call John Hillenbrand of my staff at (510) 286-0671 if you have any questions.

Sincerely,

Lawrence P. Kolb
for
Steven R. Ritchie
Executive Officer

Attachments: Adopted Site Cleanup Order No. 94-130
Mailing List

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER 94-130

REVISED SITE CLEANUP REQUIREMENTS FOR:

Hewlett-Packard Company
640 Page Mill Road and 395 Page Mill Road
Palo Alto
Santa Clara County

Varian Associates
601 California Avenue
Palo Alto
Santa Clara County

Stanford University
Palo Alto
Santa Clara County

The California Regional Water Quality Control Board, San Francisco Bay Region (hereinafter called the Board) finds that:

1. <u>Site Location and Description</u> The sites addressed by this Order include on and off-site contamination from Hewlett-Packard 640 Page Mill Road (640 site), Varian Associates 601 California Avenue (601 site) and Hewlett-Packard 395 Page Mill Road (395 site) in Palo Alto. The 601 and 640 sites are located within Stanford Research Park. These areas are described below.

   Stanford University has owned the Stanford Research Park property since 1885. The research park consists of 655 acres with approximately 60 tenants. Most of the tenants have 51- or 99-year ground leases and operate the facilities on their sites.

   Hewlett-Packard Company (HP) operated the Optoelectronics Division at 620 and 640 Page Mill Road between 1964 and 1986. The 640 site was primarily used for the manufacture of gallium arsenide and silicon based semiconductors. HP, which leases the property from Stanford University, had manufacturing buildings 10 and 11 and a storage building on site. HP has redeveloped the property and constructed an office building.

Varian Associates Inc. (Varian) operated a business at 601 California Avenue between 1965 and 1991. The site was originally leased from Stanford and operated by General Electric between 1954 and 1965, and by Varian from 1966 to 1991. The buildings were sold by Varian in 1991 to Intevac. The on-site area consists of manufacturing Buildings 8 and 8A.

Hewlett-Packard Company owns and operates property and a fabrication facility at 395 Page Mill Road. The 395 site has been operated by HP since 1942 and houses various industrial operations related to the manufacture of electronic equipment. The on-site area consists of buildings 7A, 7B, 7C, 7D, 8 and 12 and former buildings 7E, 7F and 7G.

The Off-Site Area, which is composed of the California-Olive-Emerson (COE) Area and the Perimeter Area, is bounded by California Avenue, Emerson Street, Margarita Avenue and, generally, the boundary with the Varian Associates facility at 611 Hansen Way. The Off-Site Area excludes the 640, 601 and 395 on-site areas as described above (Figure 2).

2. <u>Site History</u>

<u>Hewlett-Packard 640</u> Volatile organic compounds (VOCs), semivolatile organics, and metals were detected at this site. The source of VOCs and semivolatiles was primarily from a 1,000 gallon steel underground waste solvent storage tank located between building 11 and the storage building. Sources of metals at the site were found in building 10, and were associated with acid neutralization sumps, piping, and operations areas. All of these metal sources have been removed. The chemicals detected most frequently at the site included gallium, arsenic, trichloroethene (TCE), 1,1,1-trichloroethane (1,1,1-TCA), and tetrachloroethene (PCE).

<u>Varian 601</u> The most frequently detected chemicals at this site include TCE, 1,1,1-TCA, and 1,1-dichloroethene (1,1-DCE). The sources of these chemicals come from two main areas. The first is a chemical handling area at the southern corner of Building 8. An above ground TCE tank was removed from this area in 1981. The second source was a 2-foot diameter dry well in the courtyard area of Building 8. The dry well was removed in 1990, at which time material at the bottom was found to contain 3.6 percent TCE. The Board has not determined whether the dry well was installed and used during Varian's or General Electric's occupancy of the site, nor has the Board determined the extent to which the chemicals detected in soil or groundwater at that site were released during Varian's or General Electric's occupancy.

Hewlett-Packard 395 The most frequently detected chemicals at this site include TCE, 1,1,1-TCA, 1,1-DCE, and PCE. There were several potential source areas, the most significant of which is located near the northeastern corner of the site. An extensive excavation program in 1992 and 1993 removed or addressed all soil source areas by excavation except the area near the northeast corner of the site. This area will be addressed as part of the final remediation as addressed in this Order.

Off-Site Area The most frequently detected VOCs in shallow groundwater in the Off-Site Area include TCE, 1,1,1-TCA, 1,1-DCE, and PCE. Investigations were completed in 1993 which defined the boundaries of this area. Other than the on-site areas, the largest contributor of chlorinated solvents to this Off-Site Area is the Varian 611 Hansen Way facility, which is not a part of this Order. This contributor has up to three areas of major shallow groundwater contamination that are either very close to or in the area designated as the Off-Site Area as defined in this Order. The Varian 611 Hansen Way facility is currently regulated by the California Department of Toxic Substances Control. Other sites within the Off-Site Area contribute less extensive contamination (fuel and VOCs) to the groundwater. Some potential sources in the Off-Site Area are identified in the Remedial Investigation (RI) Report.

In order for the remedial program required by this Order to be effective, all sources of contamination to groundwater that affect groundwater within the COE and Perimeter Areas must be identified and controlled. The Regional Board will utilize its authority under applicable law to require potential sources within the area, other than the Hewlett-Packard and Varian sites addressed in this Order, to be investigated and controlled by parties other than HP and Varian and to require those parties to coordinate their remedial activities with the activities to be carried out pursuant to this Order. In order to facilitate the effective operation of the remedial systems required by this Order, the Regional Board will provide Hewlett-Packard and Varian with information concerning sources and remedial activities that may impact such systems.

3. Adjacent Sites The COE and Perimeter Areas are bordered on the south/southwest side by research or manufacturing facilities that have or potentially have impacted groundwater. The other three sides are residential areas that are not known to be contributing to groundwater contamination. Investigations at the Varian 611 Hansen Way site and the Aydin State Superfund site under the oversight of the California Department of Toxic Substances Control have indicated that a significant contribution of groundwater contaminants is entering the COE and Perimeter Areas from these sites. Varian is currently developing plans for groundwater extraction at the 611 Hansen Way site, but has yet not completed a formal Remedial Action Plan. Other sites from outside the COE and Perimeter Areas (including those named in the RI)

may be contributing to contamination, but these sites are viewed as not significant for the purposes of commencing a groundwater cleanup as required in this Order.

4. <u>National Priority List - "Superfund"</u> On June 24, 1988, the U.S. Environmental Protection Agency (EPA) proposed adding the HP 640 PMR facility to the National Priority List (NPL), subject to the requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Final listing was made on February 1, 1990. The NPL site is defined as the vadose zone and contaminated groundwater on the 640 site and commingled groundwater in the Off-Site Area.

   The groundwater and vadose zone on the Varian 601 site is not part of the NPL site but is addressed in this order. The vadose zone at the Hewlett-Packard 395 site is not part of the NPL site but is addressed in this Order. The NPL provisions do not apply to the areas covered in this Order that are not part of the NPL site.

   Pursuant to the South Bay Multi-Site Cooperative Agreement and the South Bay Groundwater Contamination Enforcement Agreement entered into by the Board, EPA and the California Department of Toxic Substances Control (then DHS), the Board has been acting as lead regulatory agency on this site. The Regional Board will continue to regulate the dischargers' remediation consistent with CERCLA as amended.

5. <u>Regional Board Orders</u> The Board has adopted the following orders for this site:

Company/Area	Order No. (Type)	Date Adopted
Hewlett-Packard/395 Page Mill	89-050 (SCR)	4-19-89
Hewlett-Packard/640 Page Mill	90-067 (SCR)	5-16-90
	*89-037 (SCR)	3-15-89
	*87-164 (SCR) joint	12-16-87
	*87-142 (SCR) joint	10-21-87
	*86-027 (WDR)	4-16-86
Varian Associates/601 California	90-066 (SCR)	5-16-90
	*89-059 (SCR)	4-19-89
	*87-164 (SCR) joint	12-16-87
	*87-142 (SCR) joint	10-21-87
	*87-039 (SCR)	4-15-87

* These Orders have been previously rescinded.

6. <u>Geology</u> The entire COE and Perimeter Areas are underlain by interbedded alluvial fan deposits and fine-grained floodplain deposits. The alluvial fan deposits consist of a mixture of sand, gravel, silt, and clay soils. The alluvium is derived from San Francisquito and Matadero Creeks. The alluvial fans of these two creeks overlap beneath the site and contain coarse-grained channel deposits with different directional and spatial orientations. The coarse-grained units can be up to 20 feet thick. Both the coarse-grained and fine-grained alluvial units may extend over distances of thousands of feet.

   The deeper floodplain deposits can be up to 23 feet thick and appear to be continuous across the Area. The floodplain deposits are predominantly fine-grained and are usually gray in color.

7. <u>Soil and Source Investigation</u>

   <u>Hewlett-Packard 640</u> Soil investigations began at the 640 site in 1981 after a 1,000 gallon underground solvent storage tank was discovered to be leaking between building 11 and the storage building. Since then over 120 borings have been drilled on-site. The contaminated soil was found surrounding and beneath manufacturing areas, underground tanks, acid neutralization sumps, and storage areas, and resulted from releases on-site. The chemicals detected most frequently in soil at the site were arsenic, gallium, trichloroethene, 1,1,1-trichloroethane, 1,1-dichloroethene, tetrachloroethene, 1,2,4-trichlorobenzene, and phenol.

   <u>Varian 601</u> Investigations were initiated at the 601 site in 1986 after a request from the Regional Board. This investigation and a later soil gas investigation in 1987 established the courtyard as the major source of VOC contamination of soils. During this site investigation, 59 borings have been drilled on-site. A dry well in the courtyard was determined to be the main source of chemicals, and the chemical handling area in the southern corner of building 8 was determined to be a minor source. Installation and use of the dry well may have occurred during General Electric's occupancy of this site. The chemical handling area was in an area of fine-grained sediments that absorbed VOCs, while the courtyard area was generally more permeable. The chemicals detected most frequently in soil at the site are trichloroethene, toluene, ethylbenzene and xylenes.

   <u>Hewlett-Packard 395</u> Soil investigations under the direction of the Board began at the 395 site in 1983 to investigate an underground waste solvent tank. Over 140 borings have been drilled on-site and analyzed for metals, VOCs, and total petroleum hydrocarbons. Seven major source areas were identified, including a drum storage area, manufacturing areas, sumps and a storm drain. The storm drain source area in

the northeastern corner of the site released VOCs as a dense non-aqueous phase liquid (DNAPL) to the soil and groundwater. The chemicals detected most frequently in the soils at the site include trichloroethene, tetrachloroethene, 1,1-dichloroethene, and 1,1,1-trichloroethane.

8. Hydrogeology The COE and Perimeter Areas are underlain by two primary aquifers, the upper A Aquifer and the lower B Aquifer. Each of these two aquifers contains distinct sand zones. The A Aquifer extends up to 55 feet below ground surface, and groundwater is first encountered at depths between 15 and 30 feet. Within the A Aquifer, the A1 Upper (A1U) Zone is generally found between depths of 15 and 30 feet, the A1 Zone between 30 and 40 feet, and the A2 Zone between 40 and 55 feet. The fine-grained aquitards separating the three zones range from 1 to 22 feet in thickness and allow varying degrees of hydraulic communication through them. The aquitard between the A1 and A2 Zones is generally not present west of Page Mill Road and beneath the 601 site.

   The aquitard between the A and B Aquifers is approximately 12 to 23 feet thick and is composed of gray silts and clays with fine sand. Within this aquitard are localized sandy lenses which range between 0.5 and 2 feet in thickness. These lenses are referred to as the A2 Deep (A2D) Zone.

   Within the B Aquifer, the B1 Zone occurs below an approximate depth of 60 feet below ground surface. This zone is typically about 10 feet thick. Where encountered, the B2 Zone begins at approximately 85 feet below the surface and is between 6 and 33 feet thick.

   The general groundwater gradient in the A Aquifer is to the north-northeast. Groundwater flow directions are influenced locally by the preferential flow through relatively thick, transmissive aquifer sands. In the A1 Zone at certain locations, groundwater and chemicals have been deflected toward the east along preferential flow paths. This easterly deflection of chemicals is not evident in the A1U and A2 Zones.

9. Oregon Expressway Underpass This structure serves as a subsurface roadway beneath the Southern Pacific Railroad tracks, Alma Street and Park Boulevard. The underpass, built in 1958, extends 24 feet below ground surface into the A1U Zone. A dewatering system installed beneath the underpass controls natural groundwater inflow and surface runoff. This dewatering appears to affect groundwater flow in the A1U, A1 and A2 Zones and does not allow contaminants to bypass the subdrain to the north.

During the summer, the average rate of discharge is typically 140 gallons per minute (gpm) with total VOC concentrations ranging between 200 and 300 parts per billion (ppb). The discharge during winter consists of both surface water and groundwater. This significant local hydrologic feature acts to contain further migration of VOCs in groundwater in the COE area and portions of the Perimeter area.

10. Groundwater Investigation

Hewlett-Packard 640 Groundwater investigations have been ongoing at the 640 facility since 1981 after the discovery of the leaking 1,000 gallon waste solvent tank. Initial sampling of the groundwater beneath this tank found TCE (1,800,000 ppb) and TCA (1,300,000 ppb) in the A1 Zone groundwater. These concentrations indicate the strong likelihood of DNAPL at the site at that time. However, DNAPL has not been observed in either soil or groundwater at this site. Hewlett-Packard has installed and currently maintains 28 groundwater monitoring wells and has advanced 21 CPTs on-site. The chemicals detected most frequently in the groundwater beneath the 640 site include TCE, 1,1,1-TCA , 1,1-DCE and PCE.

The A1U Zone is poorly developed at the 640 site and is currently unsaturated. The aquitard separating the A1U and the A1 Zones is approximately 6 feet thick. In the central portion of the site, both the A1 and A2 Zones are composed of clean sands and gravel. The aquitard separating the A1 and A2 Zones is between 1 and 5 feet thick and does not exist at a few well locations.

The thick sands of the A1 Zone trend east-west across the central portion of the 640 site and provide a preferential pathway for groundwater flow. The A1 Zone sands grade fine-grained on the northern side of the site, which has the apparent effect of deflecting groundwater flow and a portion of the VOCs toward the east. In contrast, relatively thick A2 Zone sands occur below most of the 640 site, and groundwater and VOCs flow north in the direction of the Oregon Expressway Underpass.

Varian 601 The 601 site initiated groundwater investigations in 1986 by installing monitoring wells and presently has installed 22 groundwater monitoring wells and advanced 20 CPTs on-site and on down-gradient adjacent properties. The highest concentration of chemicals in the groundwater on-site are 43,000 ppb total VOCs in the main source area and up to 26,000 ppb total VOCs from a well near the former above ground tank in the chemical handling area. A sludge containing 3.6% TCE at the bottom of the dry well in the courtyard area indicates that the presence of DNAPL is possible. The chemicals most frequently detected in the groundwater beneath the 601 site include TCE, 1,1,1-TCA and 1,1-DCE .

The A1U Zone is well developed on the eastern half of the property beneath a portion of the courtyard where the dry well was located and nonexistent on the southwest portion where the chemical handling area is situated. The A1 and the A2 Zones are in contact with no separating aquitard present. The lithologic data indicate that the A1U and A1/A2 Zones contain a trough-like feature beneath the site which creates a preferential flow path for groundwater and contaminants.

Hewlett-Packard 395 Groundwater investigations at the 395 site began in 1981 with the investigation of a 1,000 gallon underground waste solvent tank which indicated no release to groundwater. Since that time, Hewlett-Packard has installed and currently maintains 18 groundwater monitoring wells and has advanced 31 CPTs on-site. These wells have found relatively low concentrations of contamination in the groundwater across the site, with the exception of the northeastern corner of the site where DNAPL has been found in one well. Samples from the well where the DNAPL was found indicate TCA (13,000 ppb) and PCE (39,000 ppb) are present in the A1U Zone groundwater. The chemicals detected most frequently in the groundwater beneath the 395 site include TCE, TCA, and PCE.

The A1U Zone is present across the 395 site at irregular depths but is abruptly absent on the northeastern side. Where present, the A1 Zone is thin. The A2 Zone is continuous throughout the 395 site. The Oregon Expressway Underpass dewatering system, in combination with local irregular aquifer configurations, seems to have a significant hydraulic influence on the groundwater beneath the site. Contamination in the A1U, A1 and A2 Zones beneath the 395 site appears to be drawn toward the OEU.

Off-Site Area Investigation of the Off-Site Area began in 1985 near the 640 site. Since then, 79 groundwater monitoring wells have been installed and are currently maintained, and approximately 182 CPTs have been advanced in the Off-Site Area. The chemicals detected most frequently in groundwater in the Off-Site Area A Aquifer are TCE, 1,1,1-TCA, 1,1-DCE, and PCE. Contamination in the B Aquifer is very minimal. The two main features other than the regional gradient that control the distribution of contaminants in the A Aquifer are the Oregon Expressway Underpass and the preferential flow paths created by the distribution of highly transmissive zones within the aquifers.

VOCs are the most widely distributed in the A1U and A1 Zones and together, the extent of VOCs in these two zones defines the outline of the Off-Site Area covered by this Order. The A1U is unsaturated over much of its western half. This unsaturated portion has fluctuated with the amount of recharge and has been low in recent years due to a lengthy drought.

VOCs in the A1 Zone are present in the northern and southern halves of the Off-Site Area with a region in the middle that is free of contaminants because of its low permeability. The contaminants in the northern half are primarily derived from the 601, 640 and 395 sites. The contaminants on the southern half are derived primarily from the 640 and Varian 611 Hansen Way sites.

The distribution of VOCs in the A2 Zone is more limited than the above Zones and is primarily in the northern half of the Off-Site Area. The non-fuel VOC contamination on the northern half is derived primarily from the 601 and 640 sites. The southern half has limited contaminants that are derived from Varian 611 Hansen Way in addition to other possible sites.

11. Interim Remedial Actions

Hewlett-Packard 640 Soil excavations between 1987 and 1992 have removed approximately 7,700 cubic yards of contaminated soil to Class I landfills and approximately 3,000 cubic yards to Class III landfills. Metal-contaminated soil at the site has been excavated to background throughout the entire vadose zone where it was present. All semi-VOCs above 10 ppm have been excavated. Residual VOCs remain at the site above the remediation goal of 1 ppm and are being remediated by the 28-well soil vapor extraction system which went on-line in April 1994.

Groundwater remediation on-site was initiated in 1982 for seven months. Extraction was restarted in 1987 and has continued up to the time of this Order. During redevelopment, temporary extraction wells were used in order to maintain continuous contaminant removal. Groundwater extracted from on-site extraction wells EW-4, EW-5, and EW-7 in addition to off-site wells discussed below will be treated at the 640 site.

Varian 601 In 1990, the dry well in the courtyard, dry well contents, and soils in the vicinity of the dry well were removed. In 1991, soil vapor extraction was initiated in four wells to address contamination in the courtyard area. This was expanded in 1992 with 8 additional wells and in 1993 by adding two more wells in the area of the chemical handling area. The use of one well was discontinued due to cleanup of surrounding soils.

Groundwater extraction began at the 601 site in 1987 near the source area in the courtyard. In 1991, an extraction well was installed near the former above ground solvent tank in the chemical handling area. A third well was installed in a downgradient area off-site in 1992. A fourth well is scheduled to begin extraction as part of the off-site phased groundwater extraction program.

Hewlett-Packard 395 Soil remediation at the site was initiated in 1986 with the operation of a SVE system at the 1,000 gallon underground storage tank. This system was shut down in 1989 after concentrations of contaminants in the soil dropped to acceptable levels. Site-wide soil excavation was conducted in 1992 and 1993 and removed 2,100 cubic yards. Additional contaminated soil exists and will be remediated with the DNAPL area in the northeastern corner of the property as part of future cleanup activities. Additional cleanup activities may be conducted during site redevelopment scheduled to begin by 1995.

Groundwater extraction well EW-11 was installed in 1992 in the northeast corner of the site to remediate the A1U and A1 Zones. Discovery of 12 inches of PCE and TCA DNAPL in one of the nearby observation wells caused EW-11 to be abandoned since it penetrated two aquifer zones. Since that time, the DNAPL- containing observation well has been pumped to remove the DNAPL, and groundwater extraction in this area has been temporarily delayed pending reevaluation of cleanup methodologies. When groundwater treatment is initiated, it will likely take place at the 395 site.

Off-Site Area Groundwater extraction in the Off-Site Area was initiated in 1988 on the Mayfield school property by the installation of A1U wells EW-1 and EW-2. Off-site extraction wells EW-8 through EW-11 and EW-13 have been installed. The treatment system for 640 on-site and off-site wells EW-1, -2, -6, -8, -9, and -10 is located on the 640 site. Extraction well EW-6 was placed in the A1/A2 Zone beneath the Mayfield school property in 1992 to address elevated (10,000 ppb TCE) concentrations of contaminants. Phased groundwater extraction for all off-site wells is currently under way and is scheduled to be fully implemented by September 1994. Groundwater from EW-13 will be treated at Building 1 at the Varian 611 Hansen Way site. Regional groundwater extraction in the COE and Perimeter Areas and at the Varian 611 Hansen Way site will be coordinated when additional extraction wells to be located on-site at the Varian 611 site come on-line after September 1994.

12. Baseline Public Health Evaluation A Baseline Public Health Evaluation (BPHE), dated September 1992, was prepared by EPA for the COE and Perimeter Areas to evaluate current and potential future health risks posed by the site. Potential current risks are estimated based on exposures that may be presently occurring. Potential future health risks are based on exposures that potentially could occur in the future if residential development occurs on the site or if untreated groundwater was used for human consumption. To ensure that human health is protected, the BPHE incorporated conservative assumptions. Therefore, it is very unlikely that the actual risks posed by the site would be greater than estimated. Average case and maximum case scenarios are presented in the BPHE. This finding refers to a 70 year duration

exposure. The BPHE found that potential current exposures at the site do not result in a carcinogenic risk greater than 1×10^{-4}. These exposures include inhalation of indoor air on and off-site that could result from volatilization off of groundwater. The potential noncarcinogenic hazard index estimated in the BPHE for inhalation of vapor volatilizing off the groundwater ranged from less than 1.0 to 9. EPA recommends that excess cancer risk not exceed a range of 1×10^{-4} to 1×10^{-6} and that the non-carcinogenic hazard index not exceed 1.0

Potential future exposures if no cleanup were to occur could include ingestion of groundwater, inhalation of vapor volatilized from on-site soil and groundwater or inhalation of VOCs from domestic use of groundwater. Without cleanup, the maximum carcinogenic risk estimated in the BPHE to a future on-site resident (adult or child) from ingestion of groundwater, inhalation of VOCs from the use of groundwater and inhalation of vapor from volatilized soil and groundwater would be 1×10^{-3}. The total potential noncarcinogenic hazard index for ingestion of shallow groundwater and inhalation of VOCs from the use of groundwater was estimated to be 30.

Actual future risk is likely to be lower than these estimated potential risk numbers because the assumptions on which these calculations are based are likely to overestimate exposure. For example, these estimated risk calculations assume that the highest chemical concentrations from the entire site area can be found in every well. Therefore, for most of the plume area, including the Off-Site Area, chemical concentrations actually measured are much lower than the concentrations used to estimate these risks.

Finally, even using the conservative exposure scenarios of the BPHE, the actual risk from exposure to groundwater will be much lower than the estimated risks because HP and Varian are currently cleaning up the groundwater. HP and Varian's comments on the BPHE are presented in Appendix L of the RI.

a. Chemicals of Concern Of the 34 chemicals detected in groundwater during the Remedial Investigation, the chemicals of concern are those found to be present in groundwater at concentrations exceeding maximum contaminant levels or detected at concentrations thal exceed the upper bound excess carcinogenic risk and/or exceed non-carcinogenic health based values.

b. Toxicity Classification of Chemicals of Concern The final list of chemicals of concern for target cleanup levels in soil and groundwater are identified in the table below.

The EPA categories for carcinogenic classification as applied to the chemicals of concern are: A (human carcinogen with sufficient evidence in human epidemiological studies), B2 (probable human carcinogen, with inadequate human evidence and sufficient evidence from animal experiments), and C (possible human carcinogen, limited evidence of carcinogenicity in animals with inadequate human data).

chemical	
CARCINOGENS	class
arsenic*	
benzene	A
1,1-dichloroethane (1,1-DCA)	C
1,2-dichloroethane (1,2-DCA)	B2
cis-1,2-dichloroethene (*cis*-1,2-DCE)	C
methylene chloride	B2
tetrachloroethene (PCE)	B2
1,1,2-trichloroethane	C
trichloroethene (TCE)	B2
NON-CARCINOGENS	
acetone	
1,2-dichlorobenzene	
1,1-dichloroethene (1,1-DCE)	
trans-1,2 dichloroethene (*trans*-1,2 DCE)	
freon 113	
1,2,4-trichlorobenzene	
1,1,1-trichloroethane (1,1,1-TCA)	
toluene*	
total xylenes*	

* Chemical found only in soil

13. <u>Remedial Investigation / Feasibility Study / and Final Remedial Action Plan</u>
Hewlett-Packard and Varian Associates completed a first draft Remedial Investigation/Feasibility Study (RI/FS) in April 1991. After additional work, a second draft was submitted in June 1993. Comments by Board staff have been incorporated in a final RI/FS dated May 1994. The technical information contained

in the RI/FS is consistent with the Health and Safety Code requirements for a final remedial action plan and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) requirements for a RI/FS. Regional Board staff have determined that the technical information contained in the Feasibility Study is acceptable for developing a final cleanup plan for the site. The FS contains an evaluation of ARARs, a discussion of interim remedial actions, an evaluation of final remedial actions, and proposed remedial standards. The final Remedial Action Plan for the site will consist of this Order, the Remedial Investigation/Feasibility Study, and the Regional Board Proposed Plan Fact Sheet.

14. Remedial Alternatives The Feasibility Study identified a range of general response actions and remedial technologies. Three remedial alternatives were developed and evaluated: 1) no action, 2) continuation of current groundwater and soil vapor extraction, and 3) additional groundwater extraction and continuation of soil vapor extraction. All scenarios include continued operation of the Oregon Expressway Underpass. A complete description of these alternatives is contained in the Feasibility Study.

15. Summary of Evaluation Criteria EPA's National Contingency Plan identifies nine evaluation criteria to be used to evaluate remedial alternatives (40 CFR 300.430). The RI/FS contained a detailed evaluation using these nine criteria as well as similar criteria found in Section 25356.1 of the California Health and Safety code. The nine criteria are:

Overall protection of human health and the environment This criterion addresses whether a remedy provides adequate protection of human health and the environment.

Compliance with applicable or relevant and appropriate requirements (ARARs) This criterion addresses whether a remedy will meet all of the ARARs or other Federal and State environmental laws. ARARs for the site are discussed in detail in the RI/FS.

Long-term effectiveness and permanence This criterion refers to expected residual risk and residual chemical concentrations after cleanup goals have been met and the ability of a remedy to maintain reliable protection of human health and the environment over time.

Reduction of toxicity, mobility or volume This criterion refers to the anticipated performance of the treatment technologies a remedy may employ.

Short-term effectiveness This criterion addresses the period of time needed to achieve cleanup and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until cleanup goals are achieved.

Implementability This criterion refers to the technical and administrative feasibility of a remedy.

Cost This criterion includes estimated capital and operation and maintenance costs, usually presented in a 30 year present worth format.

Support Agency Acceptance This criterion addresses EPA's acceptance of the selected remedy and any other EPA comments.

Community Acceptance This criterion summarizes the public's general response to the alternatives.

16. Selected Final Remedy The selected remedy is Alternative 2, for the reasons stated in Finding 17. Alternative 2 includes the following elements:

a. Soil The chosen alternative consists of operating the existing vapor extraction wells at the 640, 395 and 601 sites. Additional soil vapor extraction wells may be needed in the northeastern corner of the 395 site. The soil vapor wells will continue to operate until levels of 1 mg/kg total VOCs are achieved, unless the discharger can demonstrate that a proposed alternative level will be protective of human health and the environment. In addition, when areas beneath existing structures at the 395 and 601 sites become accessible, additional characterization and reevaluation of alternatives to meet the 1 ppm total VOC cleanup standard may be required.

b. Groundwater Operation of the current groundwater extraction system will continue with additional wells to capture and treat contaminated groundwater until drinking water quality is achieved, or until groundwater cleanup standards are modified as described in Findings 19 and 20. As outlined in the Feasibility Study, additional extraction wells will be added near the Lockheed-occupied site and near Lambert and Ash and Portage and Ash. The estimated time to achieve groundwater cleanup is unknown. The estimated 30 year present worth cost is $15.5 million. Groundwater will be treated at the 640 site, the 601 site, the 395 site, and the Varian 611 Hansen Way site. Reuse of water will be attempted as much as possible in accordance with Board Resolution 88-160.

Long term monitoring will be required after cleanup levels are achieved. The duration and complexity of the monitoring will be determined at that time.

A deed restriction will be filed by HP for the 395 site and by Stanford University for the 640 site and the 601 site in their capacity as landowners, prohibiting use of on-site groundwater for drinking water until final cleanup standards are achieved.

17. Remedy Selection Rationale and Statutory Determinations

a. BASIS FOR REJECTION

Alternative 1: Continued Operation of Current Extraction Wells; Groundwater Monitoring; No Further Action Regarding Vadose Zone Soils

This alternative has been rejected because it may allow some groundwater containing chemicals above cleanup standards to migrate beyond the estimated capture zone of the overall remediation system. In addition, chemicals remaining in soils may migrate downward and impact groundwater.

Alternative 3: Expanded Groundwater Extraction and Treatment Groundwater Monitoring Continues.

This alternative has been rejected because the additional cost of implementation is not justified.

b. BASIS FOR ACCEPTANCE

Alternative 2: Expanded Groundwater Extraction and Treatment and Existing Soil Vapor Extraction, Groundwater Monitoring Continues.

Overall Protection of Human Health and the Environment

Constituents in groundwater are contained within a defined area and contaminated groundwater is properly treated and released, under permit. Extraction, treatment, and disposal provides for the future protection of human health and the environment.

Compliance with ARARs

The cleanup goal for groundwater cleanup is the State or Federal MCL, whichever is more stringent. The goal of this remedial action is to restore groundwater to its beneficial uses.

Long Term Effectiveness

Once chemical concentrations in groundwater and soils are reduced to cleanup standards, potential long-term risks identified in the BPHE are reduced. Treatment residuals are treated and disposed of off-site with appropriate controls in permitted facilities, thus reducing the potential risk of exposure. Long term management plans include continued groundwater monitoring. The FS estimates that the time to reach MCL standards in groundwater is at least 30 years.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Expanded groundwater extraction, treatment, and soil vapor extraction facilities will decrease the volume of the chemicals of concern in the groundwater and the toxicity of the groundwater.

Short Term Effectiveness

Risks of worker exposure to chemicals during system installation and operation are minimal, and safety measures will be implemented. No environmental impacts or potential risks to the community are expected. Short term operation of the groundwater extraction wells will contain the groundwater contamination in a defined area and result in decreased concentrations of the chemicals of concern. Vapor extraction from soils will enhance removal of contaminants and prevent additional groundwater from becoming contaminated. Evaluation of the effectiveness of extraction, treatment, and discharge will occur periodically in accordance with the agency requirements.

Implementability

The groundwater extraction, treatment, and discharge alternative is being implemented at the 640 and 601 sites and in the Off-Site Area. Implementation in other areas is also achievable.

Cost

Present value costs for the selected alternative as presented in the RI/FS are $15.5 million over 30 years, which includes installation of additional wells and operation and maintenance of the entire system.

Support Agency Acceptance

Groundwater and soil vapor extraction, treatment, and discharge will likely be acceptable to all involved agencies.

Community Acceptance

Community response to groundwater extraction and treatment, and soil vapor extraction were considered in choosing the proposed alternative. The community supports these methods of treatment.

18. Cleanup Standards The groundwater cleanup standards for the site are U.S. Environmental Protection Agency MCLs, California Department of Health Services MCLs or, for acetone, a target level based on toxicity characteristics published by EPA. Applicable MCL Goals (i.e., greater than zero) are met by the cleanup standards required by this Order.

Groundwater extraction will continue until drinking water quality is achieved, if feasible. If these standards are determined to be infeasible, groundwater extraction shall continue as long as significant quantities of chemicals are being removed through groundwater extraction. Achieving drinking water quality is an ARAR for this site. If drinking water quality cannot be achieved, the dischargers must demonstrate to the satisfaction of the Regional Board and EPA that the conditions for waiving an ARAR are met (e.g., that meeting the ARAR is technically impracticable from an engineering perspective) and that the alternative proposed will be protective of human health and the environment. The Order will then need to be modified by the Regional Board and, to the extent the modification affects the NPL Site, the US EPA Record of Decision (ROD) will need to be modified by EPA to allow a less stringent groundwater cleanup level.

The soil cleanup standard of 1.0 mg/kg for total VOCs is intended to prevent leaching of VOCs to groundwater at a level which would result in concentrations of VOCs in groundwater in excess of MCLs, thereby protecting groundwater quality.

19. Risks Associated with Cleanup Standards The selected remedy is protective of human health and the environment, as required by Section 121 of CERCLA. EPA considers a carcinogenic risk range of 1×10^{-4} to 1×10^{-6} as acceptable. If the noncarcinogenic Hazard Index is less than 1, EPA considers the combined intake of chemicals unlikely to pose a health risk.
The cleanup standards for the COE and Perimeter Areas are protective of human health, have a carcinogenic risk that falls within a range of 1×10^{-4} to 1×10^{-6}, and a

Hazard Index of less than 1. The method and assumptions used to obtain the Carcinogenic Risk and Hazard Index associated with the cleanup standards are contained in the RI/FS and the BPHE.

20. Uncertainty in Achieving Cleanup Standards The goal of this remedial action is to restore groundwater to its beneficial uses. Based on information obtained during the RI and a careful analysis of all remedial alternatives, the Board believes that the selected remedy will achieve this goal. However, studies at other sites suggest that groundwater extraction and treatment will not be, in all cases, completely successful in reducing contaminants to health based levels in the aquifer zones. The Board recognizes that operation of the selected extraction and treatment system may indicate the technical impracticability of reaching MCL-based groundwater quality standards using this approach. If it becomes apparent during implementation of this system that contaminant levels have ceased to decline and are remaining at levels higher than the remedial standards, or if the data otherwise suggest that achievement of the standards is technically impracticable or cannot be achieved within a reasonable time frame, the standards and remedy may be reevaluated.

21. Future Changes to Cleanup Standards If new information indicates cleanup standards cannot be attained or can be surpassed, the Board and EPA will decide if further final cleanup actions, beyond those completed, shall be implemented at this Site. If changes in health criteria, administrative requirements, site conditions, or remediation efficiency occur, then the dischargers may, or at the request of the Executive Officer shall, submit an evaluation of the effects of these changes on the cleanup standards defined in Specification B.3 and 4.

The Regional Board recognizes that the dischargers have already performed extensive investigative and remedial work and that the dischargers are being ordered hereby to perform additional remedial tasks. It is in the public interest to have the dischargers undertake such remedial actions promptly and without prolonged litigation or the expenditure of public funds. The Regional Board recognizes that an important element in encouraging the dischargers to invest substantial resources in undertaking such remedial actions is to provide the dischargers with reasonable assurances that the remedial actions called for in this Order will be the final remedial actions required to be undertaken by the dischargers. On the other hand, the Regional Board also recognizes its responsibility to protect water quality, public health, and the environment and that future developments could indicate that some additional remedial actions may be necessary.

The Regional Board has considered and balanced these important considerations, and has determined that the remedial actions ordered herein represent the Regional

Board's best, current judgment of the remedial actions to be required of the dischargers. The Regional Board will not require the dischargers to undertake additional remedial actions with respect to the matters previously described herein unless: (1) conditions on the site, previously unknown to the Regional Board, are discovered after adoption of this Order, or (2) new information is received by the Regional Board, in whole or in part after the date of this Order, and these previously unknown conditions or this new information indicates that the remedial actions required in this Order may not be protective of public health and the environment. The Regional Board will also consider technical practicality, cost effectiveness, State Board Resolution No. 68-16 and other factors evaluated by the Regional Board in issuing this Order and in determining whether such additional remedial actions are appropriate and necessary.

22. Named Dischargers Hewlett-Packard Company (herein referred to as a discharger) is a discharger because of the release of chemicals that have resulted from its facilities at 640 Page Mill Road and 395 Page Mill Road, and because it owns the property at 395 Page Mill Road. Varian Associates (herein referred to as a discharger) is a discharger because of the releases of chemicals that have occurred at 601 California Avenue. Stanford University (hereinafter referred to as a discharger) is a discharger because it owns the property at 640 Page Mill Road and 601 California Avenue. Stanford University (secondarily responsible) will be responsible for performance of Tasks 1A, 2A, 9A, 10A, and 17 below and for compliance with the remaining Tasks associated with the 640 site, 601site and off-site area only in the event that Hewlett-Packard and/or Varian Associates (primarily responsible, as applicable) fail to comply with the requirements of this Order.

If additional information is submitted indicating that any other party caused or permitted any waste to be discharged in the COE or Perimeter Areas or in any adjacent area where the waste entered or could have entered waters of the State, the Board will consider adding that party's name to this Order.

23. Joint Order This Order is written as a joint Order for 640 Page Mill Road, 601 California Avenue, and 395 Page Mill Road because the groundwater plumes from these source areas have commingled. The dischargers are encouraged to submit joint reports for the Off-Site Area. If joint reports are not submitted, the individual dischargers are still responsible for the joint tasks in this Order.

24. Potentially Responsible Parties Results of the Potentially Responsible Party (PRP) search pursuant to Health and Safety Code Section 25356.1 are that Hewlett-Packard Company and Varian Associates are potentially responsible parties (and therefore are named as dischargers) associated with the releases of pollutants previously discussed

in this Order. Stanford University is also a potentially responsible party (and also a named discharger) because it both (i) is the current owner of the 601 California Avenue and 640 Page Mill Road properties at which pollutants are currently located and (ii) was the owner of the above mentioned properties where the previously discussed releases of pollutants have occurred in the past. However, nothing in these findings or in this Order shall limit the rights or abilities of these parties to identify other potentially responsible parties for purposes of cost recovery under any applicable law.

25. Non-Binding Allocation of Responsibility (NBAR) Section 25356.1 of the California Health and Safety Code requires a final remedial action plan (RAP) to include a non-binding allocation of responsibility (NBAR) among all identifiable potentially responsible parties at the site. Any potentially responsible party or combination of parties assigned more than 50% of the liability in the NBAR may seek binding arbitration to allocate the costs of implementing the selected remedy (see Section 25356.3).

26. Lead Agency Pursuant to the South Bay Multi-Site Cooperative Agreement and the South Bay Ground Water Contamination Enforcement Agreement, entered into on May 2, 1985, (as amended) by the Regional Board, EPA, and DTSC, the Regional Board has been acting as the lead agency. EPA is expected to agree with the remedy selected and issue a Record of Decision following adoption by the Regional Board of the final remedy for the site. The Regional Board will continue to regulate the dischargers' remediation and administer enforcement actions in accordance with CERCLA (as amended by SARA), the California Water Code, the California Health and Safety Code, and regulations adopted thereunder.

27. Deed Restrictions By a letter submitted by Hewlett-Packard dated September 7, 1994 and a letter from Varian dated August 12, 1994, both companies have notified current tenants and will notify future tenants as to the location of hazardous materials in the subsurface and the potential health hazards associated with such materials.

28. Administrative Record The Administrative Record for the NPL site has been prepared in accordance with EPA guidance, has been made available for public and PRP review, and provides the backup documentation for recommendations of staff and decisions by the Board. The administrative record is available for review at the Water Board offices in Oakland and important documents are available at the US Geological Survey, 345 Middlefield Road in Menlo Park.

29. Community Involvement An aggressive community involvement program has been ongoing for the Hewlett-Packard and Varian sites named in this Order. The Board

published a notice in the July 15, 1994 issue of the *Palo Alto Weekly* announcing the proposed final Remedial Action Plan and opportunity for public comment at the Board hearing of July 20, 1994 in Oakland, and announcing the opportunity for public comment at an evening community meeting to be held at the Escondido School in Palo Alto on July 26, 1994. A presentation of the proposed final cleanup plan was made at the September 21, 1994 Board meeting and the July 26, 1994 evening community meeting. The 30 day comment period was from July 20 to August 19, 1994.

Since 1989, five fact sheets have been mailed to interested residents, local government officials, and media representatives. Fact sheet 1, mailed in September, 1989 summarized the contamination problems at 640 and described interim cleanup actions. A second fact sheet published in January 1990 listed revisions to the original investigation and cleanup schedule and included 601 information. The third fact sheet, published in December 1991, summarized the results of additional investigation at the site as well as interim cleanup actions. The fourth fact sheet of October, 1992 described the health assessment and the further definition of the plume. Fact sheet 5 was mailed out in June and explained the final proposed plan for site cleanup.

The Barron Park Association Foundation, an active community group in the area, has been given a Technical Assistance Grant by the US EPA to help assist the community examine technical documents regarding investigation and cleanup of the site.

30. <u>State Water Resources Control Board Resolution No. 68-16</u> On October 28, 1968, the State Board adopted Resolution 68-16, "Statement of Policy with Respect to Maintaining High Quality Waters in California." This policy calls for maintaining the existing high quality of State waters unless it is demonstrated that any change would be consistent with the maximum public benefit and not unreasonably affect beneficial uses. The original discharge of waste to groundwater at this site was contrary to this policy. Therefore, the groundwater quality needs to be restored to its original quality to the extent reasonable. Shallow groundwater at the site is designated as a potential source of drinking water. For this reason, MCLs are acceptable as concentrations that meet the intent of Resolution 68-16.

31. <u>Regional Board Resolution No. 88-160</u> This resolution strongly encourages the maximum feasible reuse of extracted groundwater from groundwater remediation activities, either by the discharger or by other public or private water users. Currently, treated groundwater from interim groundwater remediation at 640 Page Mill Road and 601 California Avenue that is not reused for irrigation and/or gray water is discharged to the sanitary sewer, and is available for reuse as effluent from the Palo Alto sewage treatment plant. Hewlett-Packard has conducted a reuse study

for its existing and planned groundwater treatment facilities at 395 and 640 Page Mill Road, and Varian has conducted a similar reuse study for 601 California Avenue. The Board will assess future compliance with this resolution if and when the dischargers apply to discharge treated groundwater to surface waters.

32. Water Quality Control Plan The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 17, 1986, and the State Board approved it on May 21, 1987. The Basin Plan contains water quality objectives and beneficial uses of surface and ground waters.

    The existing and potential uses of groundwater underlying and adjacent to the site include:

    a. Industrial process water supply
    b. Industrial service water supply
    c. Municipal and domestic water supply
    d. Agricultural water supply

    Shallow groundwater underlying and adjacent to the site is currently not used for any of the above uses.

33. The dischargers have caused or permitted, and threaten to cause or permit waste to be discharged or deposited where it is or probably will be discharged to waters of the State and creates or threatens to create a condition of pollution or nuisance.

34. This action is an order to enforce the laws and regulations administered by the Board. This action is categorically exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to Section 15321 of the Resources Agency Guidelines.

35. The Board has notified the dischargers and interested persons and agencies of its intent under California Water Code Section 13304 to prescribe Site Cleanup Requirements for the discharge and has provided them with the opportunity for a public hearing and an opportunity to submit their written views and recommendations.

36. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code and Section 25356.1 of the California Health and Safety Code, that the dischargers shall cleanup and abate the effects described in the above findings as follows:

A. PROHIBITIONS

1. The discharge of wastes or hazardous materials in a manner which will degrade water quality or adversely affect the beneficial uses of the waters of the State is prohibited.

2. Further significant migration of pollutants through subsurface transport to waters of the State is prohibited.

3. Activities associated with subsurface investigation and cleanup which will cause significant adverse migration of pollutants are prohibited.

B. SPECIFICATIONS

1. The storage, handling, treatment, or disposal of soil or groundwater containing pollutants shall not create a nuisance as defined in Section 13050(m) of the California Water Code.

2. The dischargers shall conduct monitoring activities as determined by the Executive Officer to define the current local hydrogeologic conditions, and the lateral and vertical extent of soil and groundwater pollution. Should monitoring results show evidence of plume migration, additional characterization of the pollutant plume may be required.

3. Groundwater cleanup standards for all SMP wells are set forth in Table 1.

4. The soil cleanup standard is 1 ppm for total VOCs.

5. The dischargers shall implement the final cleanup plan as described in Finding 16.

6. Cost Recovery: Pursuant to Section 13304 of the California Water Code, the dischargers are hereby notified that the Board is entitled to, and may seek reimbursement of, all reasonable costs actually incurred by the Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, as required by this Order.

C. PROVISIONS

1. The dischargers shall comply with the attached Self-Monitoring Program.

2. The dischargers shall comply with this Order immediately upon adoption and shall comply with the Prohibitions and Specifications described above in accordance with the following tasks and compliance dates. With regard to the 640 Page Mill Road site, the 601 California Avenue site, and the Off-Site Area, in the event that Hewlett-Packard and/or Varian Associates, as applicable, fail to comply with this Order, the Executive Officer may notify Stanford University and Stanford University shall be responsible for compliance.

3. HEWLETT-PACKARD 640 PAGE MILL ROAD ON-SITE
(Hewlett-Packard and Stanford University)

a. **COMPLETION DATE: December 1, 1994**

TASK 1: PROPOSED CONSTRAINTS: Stanford University shall submit a technical report acceptable to the Executive Officer documenting procedures to be implemented for a deed restriction for the 640 site prohibiting the use of on-site contaminated groundwater as a source of drinking water. The Executive Officer may approve an alternative mechanism if it accomplishes the same function as a deed restriction. Constraints shall remain in effect until groundwater cleanup standards have been achieved and pollutant levels have stabilized in the aquifers beneath the site.

b. **COMPLETION DATE: Before building occupancy by new tenant**

TASK 2: PROPOSED CONSTRAINTS: Hewlett-Packard shall submit a technical report acceptable to the Executive Officer documenting that Hewlett-Packard has notified future tenants as to the locations of hazardous materials in the subsurface and the potential health hazards associated with such materials.

c. **COMPLETION DATE: 60 days after Executive Officer's approval of above task.**

TASK 3: IMPLEMENT CONSTRAINTS: Stanford University shall submit a technical report acceptable to the Executive Officer documenting that a deed restriction or alternative approved constraints have been implemented.

d. **COMPLETION DATE: July 1, 1995**

TASK 4: EVALUATE EFFECTIVENESS OF SOIL VAPOR EXTRACTION SYSTEM: Hewlett-Packard shall submit a technical report acceptable to the Executive Officer which documents implementation of the approved SVE system, which is described in the Feasibility Study, evaluates effectiveness of the entire soil vapor extraction system, and proposes modifications to the system, if necessary, and a time schedule to accomplish the cleanup standard. This evaluation should include the installation of soil vapor monitoring devices needed to assess the effectiveness of the soil vapor extraction system.

e. **COMPLETION DATE: According to the schedule in the above Task approved by the Executive Officer.**

TASK 5: START-UP OF MODIFICATIONS TO SOIL VAPOR EXTRACTION SYSTEM: Hewlett-Packard shall submit a technical report acceptable to the Executive Officer documenting completion of any modifications identified in the above Task.

f. **COMPLETION DATE: 60 days prior to proposed curtailment of any soil vapor extraction well or soil vapor treatment system.**

TASK 6: SOIL VAPOR WELL EXTRACTION CURTAILMENT CRITERIA AND PROPOSAL: Hewlett-Packard shall submit a technical report acceptable to the Executive Officer containing a proposal and time schedule for curtailment (i.e., termination or significant reduction of pumping rate) from any soil vapor extraction well(s) or piping and the criteria used to justify such curtailment. If the reason for curtailment is achievement of final cleanup standards, then the report shall include a proposal indicating the methods for determining concentrations of VOCs remaining in the soil. The proposal may include termination of soil vapor extraction well operation for an extended period of time to study the effects on chemical migration prior to well abandonment. The proposal shall include a schedule for implementation.

If the dischargers claim that it is not practicable to achieve cleanup standards through continued soil vapor extraction in all or any portion of the contaminated soil area and that significant quantities of chemicals are not being removed through soil vapor extraction, the dischargers shall evaluate the reductions in chemical concentrations and alternative cleanup standards that can be practicably achieved. The report shall evaluate alternative means of achieving cleanup standards, whether meeting the cleanup standard is technically impracticable and whether the alternative cleanup standard proposed will be protective of human health and the environment.

g. **COMPLETION DATE: According to the schedule in the above Task approved by the Executive Officer**

TASK 7: IMPLEMENTATION OF CURTAILMENT AND COMPLETION OF SOIL REMEDIATION: Hewlett-Packard shall submit a technical report acceptable to the Executive Officer documenting completion of the necessary tasks identified in the technical report submitted for the above task. This report shall include the results of any chemical analyses performed.

h. **COMPLETION DATE: 60 days prior to proposed curtailment of any groundwater extraction well or groundwater treatment system.**

TASK 8: GROUNDWATER EXTRACTION CURTAILMENT CRITERIA AND PROPOSAL: Hewlett-Packard shall submit a technical report and time schedule acceptable to the Executive Officer containing a proposal for curtailing pumping from any groundwater extraction well(s) and the criteria used to justify such curtailment. This report may include data to show that groundwater cleanup standards for all VOCs have been achieved and that pollutant levels have stabilized or are stabilizing, and that the potential for pollutant levels rising above cleanup standards is minimal. Curtailment of groundwater extraction means final shutdown of the system, a phased approach to shutdown, elimination of pumping in selected wells (including pulsed pumping), or a similar significant change to the system. In the case of final shutdown of any portion of the system, the report shall identify the basis for the time frame that will be used to confirm that groundwater concentrations have stabilized at or below final cleanup standards and that the potential for increases above cleanup standards is minimal in that portion of the system.

Any proposal to implement final shutdown of the system is subject to approval by the Board, and any proposal to implement a phased approach to shutdown or to eliminate the pumping in selected wells shall be subject to the approval of the Executive Officer and, if requested by the Executive Officer, the Board.

If the dischargers claim that it is not practicable to achieve cleanup standards through continued groundwater extraction in all or any portion of the groundwater plume area, the dischargers shall evaluate the reductions in chemical concentrations, the mass quantities being removed through groundwater extraction, and alternative cleanup standards that can be practically achieved. The report shall evaluate alternative means of achieving cleanup standards, whether meeting the cleanup standards is technically impracticable, cost effectiveness and whether the alternative cleanup standard proposed will be protective of human health and the environment.

i. **COMPLETION DATE:** **According to the schedule in the above Task approved by the Executive Officer**

TASK 9: IMPLEMENTATION OF GROUNDWATER EXTRACTION CURTAILMENT: Hewlett-Packard shall submit a technical report acceptable to the Executive Officer documenting completion of the necessary tasks identified in the technical report submitted for the above task.

4. **VARIAN 601 CALIFORNIA AVENUE ON-SITE**
(Varian Associates and Stanford University)

a. **COMPLETION DATE:** **December 1, 1994**

TASK 10: PROPOSED CONSTRAINTS: Stanford University shall submit a technical report acceptable to the Executive Officer documenting procedures to be implemented for a deed restriction for the 601 site prohibiting the use of on-site contaminated groundwater as a source of drinking water. The Executive Officer may approve an alternative mechanism if it accomplishes the same function as a deed restriction. Constraints shall remain in effect until groundwater cleanup standards have been achieved and pollutant levels have stabilized in the aquifers beneath the site.

b. COMPLETION DATE: **30 days following reciept of written notice to Varian of building occupancy by new tenant.**

TASK 11: PROPOSED CONSTRAINTS: Varian Associates shall submit a technical report acceptable to the Executive Officer documenting that Varian has notified future tenants as to the locations of hazardous materials in the subsurface and the potential health hazards associated with such materials.

c. COMPLETION DATE: **60 days after Executive Officer's approval of above task.**

TASK 12: IMPLEMENT CONSTRAINTS: Stanford University shall submit a technical report acceptable to the Executive Officer documenting that a deed restriction or alternate approved constraints have been implemented.

d. COMPLETION DATE: **July 1, 1995**

TASK 13: EVALUATE EFFECTIVENESS OF SOIL VAPOR EXTRACTION SYSTEM: Varian Associates shall submit a technical report acceptable to the Executive Officer which documents implementation of the expanded SVE system, evaluates effectiveness of the entire soil vapor extraction system, and proposes modifications to the system and a time schedule, if necessary, to accomplish the cleanup standard and a time schedule. This evaluation should include soil vapor monitoring devices needed to assess the effectiveness of the soil vapor extraction system.

e. COMPLETION DATE: **According to the schedule in the above Task approved by the Executive Officer.**

TASK 14: START-UP OF MODIFICATIONS TO SOIL VAPOR EXTRACTION SYSTEM: Varian Associates shall submit a technical report acceptable to the Executive Officer documenting completion of any modifications identified in the above Task.

f. **COMPLETION DATE:** **60 days prior to proposed curtailment of any soil vapor extraction well or soil vapor treatment system.**

TASK 15: SOIL VAPOR WELL PUMPING CURTAILMENT CRITERIA AND PROPOSAL: Varian Associates shall submit a technical report acceptable to the Executive Officer containing a proposal for curtailment (i.e., termination or significant reduction of pumping rate) from any soil vapor extraction well(s) or piping and the criteria used to justify such curtailment. If the reason for curtailment is achievement of final cleanup standards, then the report shall include a proposal indicating the methods for determining concentrations of VOCs remaining in the soil. The proposal may include termination of soil vapor extraction well operation for an extended period of time to study the effects on chemical migration prior to well abandonment. The proposal shall include a schedule for implementation.

If the dischargers claim that it is not practicable to achieve cleanup standards through continued soil vapor extraction in all or any portion of the contaminated soil area and that significant quantities of chemicals are not being removed through soil vapor extraction, the dischargers shall evaluate the reductions in chemical concentrations and alternative cleanup standards that can be practicably achieved. The report shall evaluate alternative means of achieving cleanup standards, whether meeting the cleanup standard is technically impracticable, cost effective, and whether the alternative cleanup standard proposed will be protective of human health and the environment.

g. **COMPLETION DATE:** **According to the schedule in the above Task approved by the Executive Officer**

TASK 16: IMPLEMENTATION OF CURTAILMENT AND COMPLETION OF SOIL REMEDIATION: Varian Associates shall submit a technical report acceptable to the Executive Officer documenting completion of the necessary tasks identified in the technical report submitted for the above task. The report shall include the results of any chemical analyses performed.

h. **COMPLETION DATE: 60 days prior to proposed curtailment of any groundwater extraction well or groundwater treatment system.**

TASK 17: GROUNDWATER EXTRACTION CURTAILMENT CRITERIA AND PROPOSAL: Varian Associates shall submit a technical report acceptable to the Executive Officer containing a proposal for curtailing pumping from any groundwater extraction well(s) and the criteria used to justify such curtailment. This report shall include data to show that groundwater cleanup standards for all VOCs have been achieved and that pollutant levels have stabilized or are stabilizing, and that the potential for pollutant levels rising above cleanup standards is minimal. Curtailment of groundwater extraction means final shutdown of the system, a phased approach to shutdown, elimination of pumping in selected wells (including pulsed pumping), or a similar significant change to the system. In the case of final shutdown of any portion of the system, the report shall identify the basis for the time frame that will be used to confirm that groundwater concentrations have stabilized at or below final cleanup standards and that the potential for increases above cleanup standards is minimal in that portion of the system.

Any proposal to implement final shutdown of the system is subject to approval by the Board, and any proposal to implement a phased approach to shutdown or to eliminate the pumping in selected wells shall be subject to the approval of the Executive Officer and, if requested by the Executive Officer, the Board.

If the dischargers claim that it is not practicable to achieve cleanup standards through continued groundwater extraction in all or any portion of the groundwater plume area, the dischargers shall evaluate the reductions in chemical concentrations, the mass quantities being removed through groundwater extraction, and alternative cleanup standards that can be practically achieved. The report shall evaluate alternative means of achieving cleanup standards, whether meeting the cleanup standards is technically impracticable, cost effectiveness, and whether the alternative cleanup standard proposed will be protective of human health and the environment.

ih. **COMPLETION DATE: According to the schedule in the above Task approved by the Executive Officer**

TASK 18: IMPLEMENTATION OF GROUNDWATER EXTRACTION CURTAILMENT: Varian Associates shall submit a technical report acceptable to the Executive Officer documenting completion of the necessary tasks identified in the technical report submitted for the above task.

j. **COMPLETION DATE: 15 days following written notice to Stanford University of planned building demolition**

TASK 19: NOTICE OF PLANNED BUILDING DEMOLITION: Stanford University shall provide the Executive Officer and Varian Associates with written notice of planned building demolition on the 601 site.

k. **COMPLETION DATE: 45 days following receipt of written notice from Stanford University of planned building demolition (or as determined, in coordination with proposed redevelopment activities).**

TASK 20: PROPOSAL FOR INVESTIGATION OF AREAS EXPOSED BY BUILDING DEMOLITION: Varian Associates shall submit a technical report acceptable to the Executive Officer proposing a sampling schedule for areas which have previously been inaccessible beneath on-site buildings because of physical or operational constraints. This includes areas which could potentially impact groundwater or the environment and were difficult to sample prior to this Order.

5. <u>HEWLETT-PACKARD 395 PAGE MILL ROAD ON-SITE</u>
(Hewlett-Packard)

a. **COMPLETION DATE: February 1, 1995**

TASK 21: PROPOSED CONSTRAINTS: Hewlett-Packard shall submit a technical report acceptable to the Executive Officer documenting procedures to be implemented for a deed restriction prohibiting the use of the contaminated groundwater as a source of drinking water. The Executive Officer may approve an alternative mechanism if it accomplishes the same function as a deed restriction. Constraints shall remain in effect until groundwater cleanup standards have been achieved and pollutant levels have stabilized in the aquifers beneath the site.

b. COMPLETION DATE: **60 days after Executive Officer's approval of above task.**

TASK 22: IMPLEMENT CONSTRAINTS: Hewlett-Packard shall submit a technical report acceptable to the Executive Officer documenting a deed restriction or alternative approved constraints have been implemented.

c. COMPLETION DATE: **February 1, 1995**

TASK 22: REMEDIATION OF NORTHEASTERN CORNER OF SITE: Hewlett-Packard shall submit a workplan and time schedule acceptable to the Executive Officer for remediation of the vadose and groundwater zones near Building 12 that have been impacted by contaminants. This area is known as Area X (ten). The workplan will justify any proposed modifications to the remediation alternatives for Area X currently recommended in the COE groundwater and 395 Site soils Feasibility Study.

d. COMPLETION DATE: **September 1, 1995**

TASK 24: EVALUATE EFFECTIVENESS OF SOIL VAPOR EXTRACTION SYSTEM: For any area of the site where SVE is implemented as the selected remedial alternative, Hewlett-Packard shall submit a technical report acceptable to the Executive Officer which documents implementation of the approved SVE system recommended in the Feasibility Study, evaluates effectiveness of the soil vapor extraction system, and proposes modifications to the system, if necessary, and a time schedule to implement those proposed modifications. This report should include an evaluation of soil vapor monitoring options needed to assess the effectiveness of the soil vapor extraction system.

e. COMPLETION DATE: **According to the schedule in the above Task approved by the Executive Officer.**

TASK 25: START-UP OF MODIFICATIONS TO SOIL VAPOR EXTRACTION SYSTEM: Hewlett-Packard shall submit a technical report acceptable to the Executive Officer documenting completion of any modifications identified in the above Task.

f. COMPLETION DATE: **60 days prior to proposed curtailment of any soil vapor extraction well or soil vapor treatment system.**

TASK 26: SOIL VAPOR EXTRACTION CURTAILMENT CRITERIA AND PROPOSAL: Hewlett-Packard shall submit a technical report acceptable to the Executive Officer containing a proposal for curtailment (i.e., termination or significant reduction in pumping rate) from any soil vapor extraction well(s) or piping and the criteria used to justify such curtailment. If the reason for curtailment is achievement of final cleanup standards, then the report shall include a proposal indicating the methods for determining concentrations of VOCs remaining in the soil. The proposal may include termination of soil vapor extraction well operation for an extended period of time to study the effects on chemical migration prior to well abandonment. The proposal shall include a schedule for implementation.

If the discharger claims that it is not practicable to achieve cleanup standards through continued soil vapor extraction in all or any portion of the contaminated soil area and that significant quantities of chemicals are not being removed through soil vapor extraction, the discharger shall evaluate the reductions in chemical concentrations and alternative cleanup standards that can be practicably achieved. The report shall evaluate alternative means of achieving cleanup standards, whether meeting the cleanup standard is technically impracticable, cost effective, and whether the alternative cleanup standard proposed will be protective of human health and the environment.

g. COMPLETION DATE: **According to the schedule in the above Task approved by the Executive Officer.**

TASK 27: IMPLEMENTATION OF CURTAILMENT AND COMPLETION OF SOIL REMEDIATION: Hewlett-Packard shall submit a technical report acceptable to the Executive Officer documenting completion of the necessary tasks identified in the technical report submitted for the above task. The report shall include the results of any chemical analyses performed.

h. **COMPLETION DATE: 60 days prior to proposed curtailment of any groundwater extraction well or groundwater treatment system.**

TASK 28: GROUNDWATER EXTRACTION CURTAILMENT CRITERIA AND PROPOSAL: Hewlett-Packard shall submit a technical report acceptable to the Executive Officer containing a proposal for curtailing pumping from any groundwater extraction well(s) and the criteria used to justify such curtailment. This report shall include data to show that groundwater cleanup standards for all VOCs have been achieved and that pollutant levels have stabilized or are stabilizing, and that the potential for pollutant levels rising above cleanup standards is minimal. Curtailment of groundwater extraction means final shutdown of the system, a phased approach to shutdown, elimination of pumping in selected wells (including pulsed pumping), or a similar significant change to the system. In the case of final shutdown of any portion of the system, the report shall identify the basis for the time frame that will be used to confirm that groundwater concentrations have stabilized at or below final cleanup standards and that the potential for increases above cleanup standards is minimal in that portion of the system.

Any proposal to implement final shutdown of the system is subject to approval by the Board, and any proposal to implement a phased approach to shutdown or to eliminate the pumping in selected wells shall be subject to the approval of the Executive Officer and, if requested by the Executive Officer, the Board.

If the discharger claims that it is not practicable to achieve cleanup standards through continued groundwater extraction in all or any portion of the groundwater plume area, the discharger shall evaluate the reductions in chemical concentrations, the mass quantities being removed through groundwater extraction, and alternative cleanup standards that can be practically achieved. The report shall evaluate alternative means of achieving cleanup standards, whether meeting the cleanup standards is technically impracticable, cost effectiveness, and whether the alternative cleanup standard proposed will be protective of human health and the environment.

i. **COMPLETION DATE: According to the schedule in the above Task approved by the Executive Officer.**

TASK 29: IMPLEMENTATION OF GROUNDWATER EXTRACTION CURTAILMENT: Hewlett-Packard shall submit a technical report acceptable to the Executive Officer documenting completion of the necessary tasks identified in the technical report submitted for the above task.

j. **COMPLETION DATE: 30 days prior to building demolition.**

TASK 30: PROPOSAL FOR INVESTIGATION OF AREAS EXPOSED BY BUILDING DEMOLITION: Hewlett-Packard shall submit a technical report acceptable to the Executive Officer proposing a sampling schedule for areas which have previously been inaccessible beneath present on-site buildings because of physical or operational constraints. This includes areas which could potentially impact groundwater or the environment and were difficult to sample prior to this Order.

6. <u>OFF-SITE AREA</u>
(Hewlett-Packard, Varian Associates, and Stanford University, as applicable)

a. **COMPLETION DATE: 90 days after request made by the Executive Officer**

TASK 31: MAINTENANCE OF OREGON EXPRESSWAY UNDERPASS GROUNDWATER CONTROL AND REMEDIATION SYSTEM: Hewlett-Packard and Varian Associates shall submit a workplan and time schedule acceptable to the Executive Officer for alternate control and remediation of groundwater if the present Oregon Expressway Underpass remediation system is rendered ineffective in remediating or preventing the spread of groundwater contamination.

b. **COMPLETION DATE: 60 days prior to proposed curtailment of any groundwater extraction well or groundwater treatment system.**

TASK 32: GROUNDWATER EXTRACTION CURTAILMENT CRITERIA AND PROPOSAL: Hewlett-Packard and Varian Associates shall submit a technical report acceptable to the Executive Officer containing a proposal for curtailing pumping from any groundwater extraction well(s) and the criteria used to justify such curtailment. This report shall include data to show that groundwater cleanup standards for all VOCs have been achieved and that pollutant levels have stabilized or are stabilizing, and that the potential for pollutant levels rising above cleanup standards is minimal. Curtailment of groundwater extraction means final shutdown of the system, a phased approach to shutdown, elimination of pumping in certain wells (including pulsed pumping), or a similar significant change to the system. In the case of final shutdown of any portion of the system, the report shall identify the basis for the time frame that will be used to confirm that groundwater concentrations have stabilized at or below final cleanup standards and that the potential for increases above cleanup standards is minimal in that portion of the system.

Any proposal to implement final shutdown of the system is subject to approval by the Board, and any proposal to implement a phased approach to shutdown or to eliminate the pumping in selected wells shall be subject to the approval of the Executive Officer and, if requested by the Executive Officer, the Board.

If the dischargers claim that it is not practicable to achieve cleanup standards through continued groundwater extraction in all or any portion of the groundwater plume area, the dischargers shall evaluate the reductions in chemical concentrations, the mass quantities being removed through groundwater extraction, and alternative cleanup standards that can be practically achieved. The report shall evaluate alternative means of achieving cleanup standards, whether meeting the cleanup standards is technically impracticable, cost effectiveness, and whether the alternative cleanup standard proposed will be protective of human health and the environment.

c. **COMPLETION DATE:** **According to the schedule in the above Task approved by the Executive Officer**

TASK 33: IMPLEMENTATION OF GROUNDWATER EXTRACTION CURTAILMENT: Hewlett-Packard and Varian Associates shall submit a technical report acceptable to the Executive Officer documenting completion of the necessary tasks identified in the technical report submitted for the above task.

d. **COMPLETION DATE:** **November 1, 1995**

TASK 34: INSTALLATION OF ADDITIONAL MONITORING WELLS: Hewlett-Packard and Varian Associates shall submit a technical report acceptable to the Executive Officer documenting installation of any remaining groundwater monitoring wells, CPTs, or hydropunches needed to assess: the effectiveness of the groundwater extraction system, the vertical and lateral distribution of the current groundwater plume and the future changes in plume dimensions as identified in a September 7, 1994 letter from Hewlett-Packard and Varian to Board staff.

e. **COMPLETION DATE: December 1, 1994**

TASK 35: WORKPLAN FOR INSTALLATION OF EXPANDED GROUNDWATER EXTRACTION AND TREATMENT SYSTEM: Hewlett-Packard and Varian Associates shall submit a workplan and time schedule acceptable to the Executive Officer for installation of the expanded groundwater extraction system, as outlined in the selected final remedy (Alternative 2) described in the Feasibility Study and for evaluation of capture area. The workplan shall contain the final construction schedule through submittal of the start-up report.

f. **COMPLETION DATE: Twelve months following approval of the workplan**

TASK 36: START-UP REPORT FOR GROUNDWATER EXTRACTION AND TREATMENT SYSTEM: Hewlett-Packard and Varian Associates shall submit a technical report acceptable to the Executive Officer documenting installation of the groundwater extraction system described in the above Task. The report shall contain as built construction drawings of the entire system and the first two weeks of monitoring data.

g. **COMPLETION DATE: Nine months following date of start-up report**

TASK 37: EVALUATE CAPTURE AREA OF IMPACTED GROUNDWATER AND PROPOSE ADDITIONAL EXTRACTION WELLS IF NECESSARY: Hewlett-Packard and Varian Associates shall submit a technical report acceptable to the Executive Officer documenting implementation of the expanded groundwater extraction system and containing an evaluation of the capture zones of all groundwater extraction systems that impact groundwater in the COE and Perimeter Areas. The capture zones must affect on- and off-site groundwater with chemical concentration above the cleanup standards that originates from the sites. This evaluation must also propose additional extraction wells, if necessary, and an implementation schedule. This report shall contain data from the on-site areas and the Off-Site Area.

h. **COMPLETION DATE: According to a schedule set in the above Task approved by the Executive Officer**

TASK 38: START-UP OF MODIFICATIONS TO GROUNDWATER EXTRACTION AND TREATMENT SYSTEM: Hewlett-Packard and Varian Associates shall submit a technical report acceptable to the Executive Officer documenting completion of any modifications identified in the above Task.

7. <u>ALL AREAS</u>
(Hewlett-Packard, Varian Associates, and Stanford University, as applicable)

a. **COMPLETION DATE: June 1, 2000**

TASK 39: FIVE YEAR STATUS REPORT AND EFFECTIVENESS EVALUATION: Hewlett-Packard and Varian Associates, as applicable, shall submit a technical report acceptable to the Executive Officer containing the results of any additional investigation; an evaluation of the effectiveness of installed final cleanup measures and cleanup costs; additional recommended measures to achieve final cleanup objectives and standards, if necessary; projected costs necessary to achieve cleanup objectives and standards; and the tasks and time schedule necessary to implement any additional final cleanup measures. This report shall also describe the reuse of extracted groundwater and evaluate and document the cleanup of contaminated groundwater. If cleanup standards in this Order have not been achieved on-site and are not expected to be achieved through continued groundwater extraction and/or soil remediation, this report shall also contain an evaluation addressing whether it is technically practicable and cost effective to achieve the cleanup standards, and if so, a proposal for procedures to do so.

b. **COMPLETION DATE: 90 days after request made by the Executive Officer**

TASK 40: EVALUATION OF NEW HEALTH CRITERIA: Hewlett-Packard and Varian Associates, as applicable, shall submit a technical report acceptable to the Executive Officer which contains an evaluation of how the final plan and cleanup standards would be affected, if the groundwater or soil cleanup standards listed in Table 1 of this Order change as a result of promulgation of revised drinking water standards, maximum contaminant levels or action levels or other health based criteria.

c. **COMPLETION DATE: 90 days after request made by the Executive Officer**

TASK 41: EVALUATION OF NEW TECHNICAL INFORMATION: Hewlett-Packard and Varian Associates, as applicable, shall submit a technical report acceptable to the Executive Officer that documents an evaluation of new technical and economic information which indicates that cleanup standards or cleanup technologies in some areas may be considered for revision. Such technical reports shall not be required unless the Executive Officer or the Board determines that such new information indicates a reasonable possibility that the Order may need to be changed under the criteria described in Findings 18 through 21.

8. The submittal of technical reports evaluating final remedial measures will include a discussion of the cost, effectiveness, and impact on human health, and the environment with the guidance provided by Subpart F of the NCP (40 CFR Part 300); Section 25356.1(c) of the California Health and Safety Code; CERCLA guidance documents; and shall be consistent with the State Water Resources Control Board's Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California."

9. If the dischargers are delayed, interrupted or prevented from meeting one or more of the completion dates specified in this order, the dischargers shall promptly notify the Executive Officer, and the Board may consider revision to this Order for such delays.

10. Technical status reports on compliance with the Prohibitions, Specifications, and Provisions of this Order shall be submitted quarterly to the Board commencing on October 15, 1994 (for June, July and August), and covering the previous quarter. Reports shall be submitted on a quarterly basis, until one year after implementation of the expanded groundwater extraction and treatment system. The technical reports may then be submitted semi-annually after the second and fourth quarters thereafter, or as required by the Executive Officer. These reports shall consist of: (1) a summary of work completed

since submittal of the previous report and work projected to be completed by the time of the next report, (2) identification of any obstacles which may threaten compliance with the schedule of this Order and what actions are being taken to overcome these obstacles, and (3) include, in the event of non-compliance with any Provision or Specification of this Order, written notification which clarifies the reasons for non-compliance and which proposes specific measures and a schedule to achieve compliance. This written notification shall identify work not completed that was projected for completion, and shall identify the impact of non-compliance on achieving compliance with the remaining requirements of this Order.

These reports shall also identify any problems with or changes in the extraction and treatment system. Additionally, the reports shall include, but not be limited to, updated water table and piezometric surface maps and plume maps for all affected water-bearing zones as specified in the current groundwater self-monitoring program requirements, and appropriately scaled and detailed base maps showing the location of all monitoring wells and identifying adjacent facilities and structures. These reports may be combined with quarterly SMRs required per Provision C.1.

11. On an annual basis beginning with the report due January 31, 1996, or as required by the Executive Officer, the status report shall include an evaluation of the progress of cleanup measures such as hydraulic control of the plume, performance of the remedy, estimation of capture zones influenced by extraction wells, establishment of cones of depression using field data, and a discussion of water quality data relevant to the evaluation of the progress of cleanup measures. The report shall also evaluate the effects of operation of existing extraction wells on groundwater levels and an estimate of the amount of chemicals removed via the extraction systems. These reports may be combined with quarterly SMRs required in Provision C.1. No such report needs to be filed in 2000.

12. Non-Binding Allocation of Responsibility: The cost of implementing the selected remedy should be allocated to Hewlett-Packard (45%) Varian Associates (45%) and Stanford (10%). These parties reserve all of their rights against and with respect to any other potentially responsible parties under any applicable law, including those named previously in this Order.

13 All technical reports or technical documents shall be signed by or stamped with the seal of a registered geologist, engineering geologist, or professional engineer.

14. All samples shall be analyzed by State certified laboratories or by laboratories accepted by the Board using approved EPA methods, where available, for the type of analysis to be performed. All laboratories shall maintain quality assurance/quality control records for Board review.

15. The dischargers shall maintain in good working order, and operate as efficiently as possible, any facility or control system installed to achieve compliance with the requirements of this Order.

16. Copies of all correspondence, reports, and documents pertaining to compliance with this Order or proposed changes to this Order shall be provided to the following agencies:

    a. Santa Clara Valley Water District
    b. U.S. Environmental Protection Agency, Region 9 (H-6-3)
    c. California EPA/DTSC Site Mitigation Branch

    The Executive Officer may additionally require copies of correspondence, reports, and documents pertaining to compliance with this Order to be provided to a local repository for public use.

17. The dischargers shall permit the Board or its authorized representative, in accordance with Section 13267(c) of the California Water Code:

    a. Entry upon premises in which any pollution sources exist or may exist, consistent with the site Health and Safety Plan, or upon premises in which any required records relevant to this Order are kept.

    b. Access to copy any records required to be kept under the requirements of this Order.

    c. Inspection of any monitoring equipment or methodology implemented in response to this Order.

    d. Sampling of any groundwater or soil which is accessible, or may become accessible, as part of any investigation or remedial action program undertaken by the dischargers.

18. If any hazardous substance, as defined by Section 13050 of the California Water Code, is discharged in or on any waters of the state, or discharged and deposited where it is, or probably will be discharged in or on any waters of

the state, the dischargers shall report such discharge to this Board, at (510) 286-1255 on weekdays during office hours (8 am to 5 pm) and to the Office of Emergency Services at (800) 852-7550 during non-business hours. A written report shall be filed with the Board within five working days and shall contain information relative to: the nature of waste or pollutant, quantity involved, duration of incident, cause of spill, SPCC plan in effect (if any), estimated size of affected area, nature of effect, corrective measures taken or planned, schedule of such measures, and persons/agencies notified.

19. Hewlett-Packard shall provide written notification of any changes in site occupancy or ownership associated with facilities at 395 Page Mill Road and 640 Page Mill Road (so long as Hewlett-Packard is a current occupant or owner of such facilities) described in this Order within one month after such changes. Stanford University shall provide written notification of any changes in site occupancy or ownership associated with facilities at 601 California Avenue and 640 Page Mill Road (so long as Stanford University is a current occupant or owner of such facilities) described in this Order within one month after such changes.

20. The Board will review this Order periodically and may revise the requirements when necessary.

21. This Order supersedes and rescinds the following Board orders:

Discharger/Area	Order No.
Hewlett-Packard/395 Page Mill Road	89-050
Hewlett-Packard/640 Page Mill Road	90-067
Varian Associates/601 California Avenue	90-066

I, Steven R. Ritchie, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on September 21, 1994.

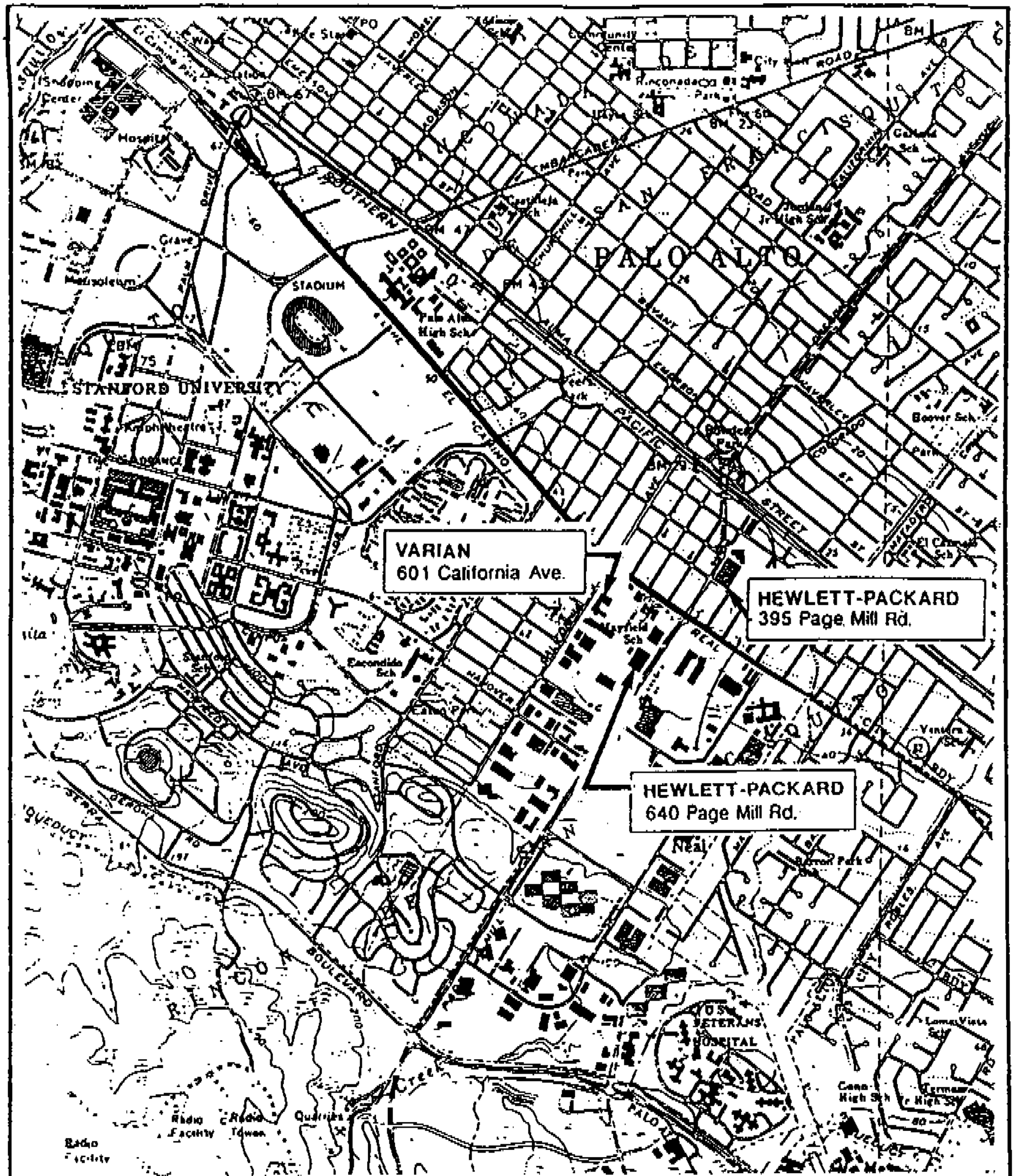
Lauren P. K— for
Steven R. Ritchie
Executive Officer

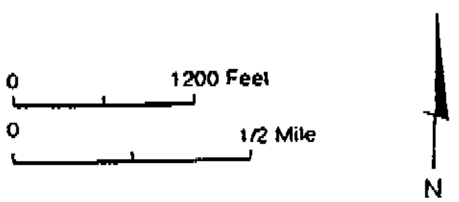
Attachments:
- Self-Monitoring Program
- Site Map
- Table 1 Groundwater Cleanup Standards

TABLE 1
SITE CLEANUP REQUIREMENTS
GROUNDWATER CLEANUP STANDARDS
HEWLETT-PACKARD 640 PAGE MILL ROAD
VARIAN 601 CALIFORNIA AVENUE
HEWLETT-PACKARD 395 PAGE MILL ROAD

CHEMICAL	CLEANUP STANDARD ug/L
Acetone	3,500
Benzene	1
1,1-Dichloroethane	5
1,2-Dichloroethane	0.5
1,1-Dichloroethene	6
cis-1,2-Dichloroethene	6
trans-1,2-Dichloroethene	10
Methylene Chloride	5
Tetrachloroethene	5
1,1,1-Trichloroethane	200
1,1,2-Trichloroethane	3
Trichloroethene	5
Freon 113	1,200
1,2-Dichlorobenzene	600
1,2,4-Trichlorobenzene	70

For all chemicals except Acetone, cleanup standards for groundwater are federal or state MCL's, whichever is lower. For acetone, there is no federal or state MCL and the cleanup standard is based on the EPA reference dose and a hypothetical maximum exposure rate.

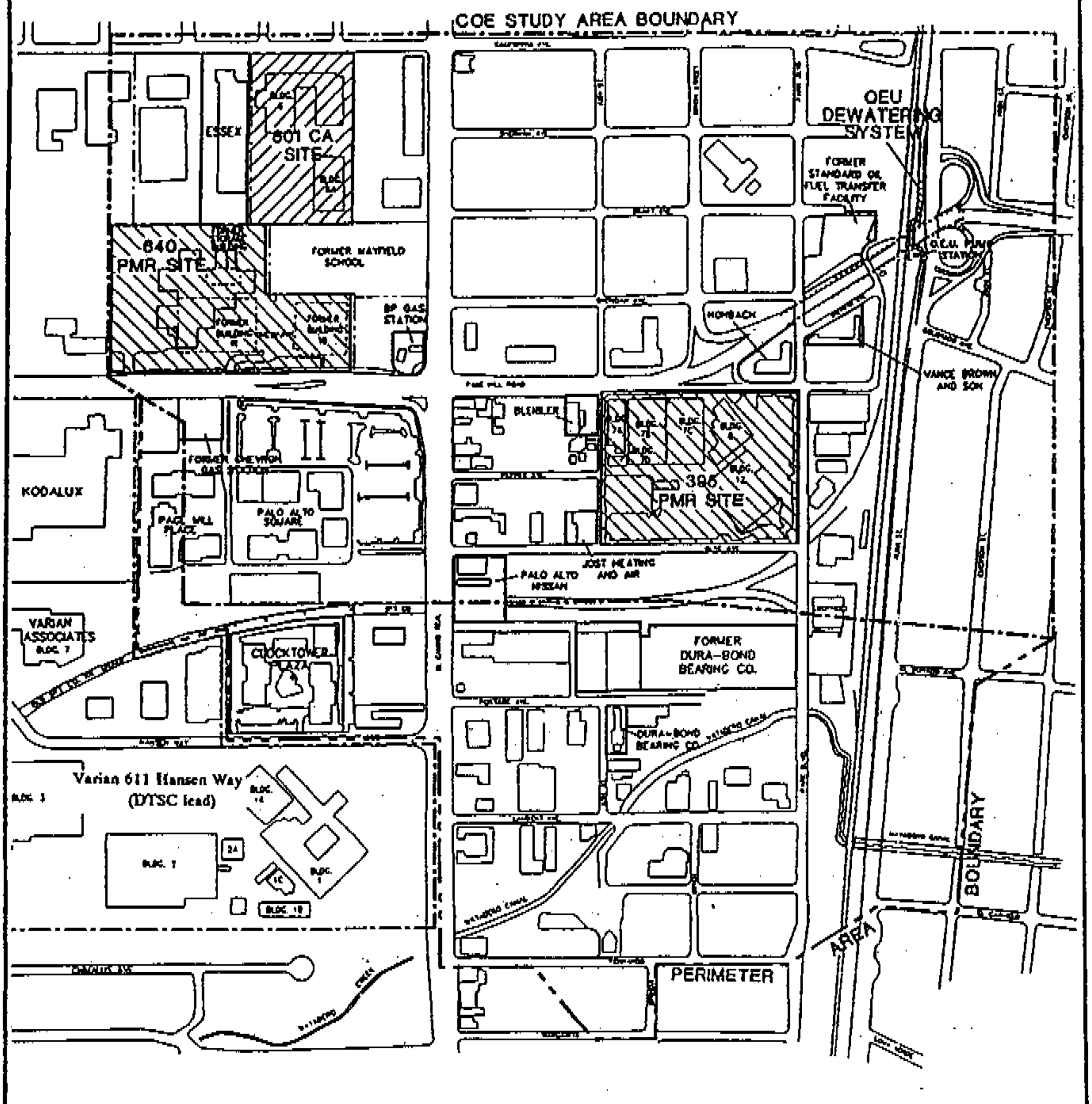




STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

Hewlett-Packard 640 Page Mill Road
Varian Associates 601 California Avenue
Hewlett-Packard 395 Page Mill Road
Palo Alto
Figure 1 Site Vicinity

DRAWN BY: jmh	DATE: 9/21/94	DRWG. NO. 1



EXPLANATION

- Study Area Boundary
- Perimeter Area Boundary
- 601 CA Site
- 395 and 640 PMR Sites
- Site Areas
- Oregon Expressway Underpass (OEU) Dewatering System
- OEU Pump Station

0 500 1000

SCALE IN FEET

ENVIRON

STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

Hewlett-Packard 640 Page Mill Road
Varian Associates 601 California Avenue
Hewlett-Packard 395 Page Mill Road
Palo Alto
Figure 2 Site Detail

DRAWN BY: jmh	DATE: 9/21/94	DRWG. NO. 2

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

GROUNDWATER SELF-MONITORING PROGRAM

FOR

HEWLETT-PACKARD COMPANY

640 Page Mill Road Facility
Palo Alto, Santa Clara County

395 Page Mill Road Facility
Palo Alto, Santa Clara County

VARIAN ASSOCIATES

601 California Avenue Facility
Palo Alto, Santa Clara County

ORDER NO. 94-130

Adopted on September 21, 1994

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

HEWLETT-PACKARD COMPANY
640 Page Mill Road
395 Page Mill Road

VARIAN ASSOCIATES
601 California Avenue

Palo Alto, Santa Clara County

GROUNDWATER SELF-MONITORING PROGRAM

A. GENERAL

Reporting responsibilities of waste dischargers are specified in Sections 13225(a), 13267(b), 13268, 13383 and 13387(b) of the California Water Code and this Regional Board's Resolution No. 73-16.

The principal purposes of a monitoring program by a waste discharger, also referred to as self-monitoring program, are: (1) to document compliance with waste discharge requirements and prohibitions established by this Regional Board, (2) to facilitate self-policing by the waste discharger in the prevention and abatement of pollution arising from waste discharge, (3) to develop or assist in the development of effluent or other limitations, discharge prohibitions, national standards of performance, pretreatment and toxicity standards, and other standards, and (4) to prepare water and waste water quality inventories.

B. SAMPLING AND ANALYTICAL METHODS

Sample collection, storage, and analyses shall be performed according to the EPA Method 8000 series in "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods," dated November 1990; or other methods approved and specified by the Executive Officer of this Regional Board.

C. REPORTS TO BE FILED WITH THE REGIONAL BOARD

1. Violations of Requirements

In the event the discharger is unable to comply with the conditions of the site cleanup requirements and prohibitions due to:

a. Maintenance work, power failures, or breakdown of waste treatment equipment, or

b. accidents caused by human error or negligence, or

c. other causes, such as acts of nature, or

d. poor operation or inadequate system design,

the discharger shall notify the Regional Board office by telephone as soon as he or his agents have knowledge of the incident and confirm this notification in writing within 5 working days of the telephone notification. The written report shall include time, date, and person notified of the incident. The report shall include pertinent information explaining reasons for the noncompliance and shall indicate what steps were taken to prevent the problem from recurring.

2. The discharger shall file a written technical report to be received at least 30 days prior to advertising for bid (or 60 days prior to construction) on any construction project which would cause or aggravate the discharge of waste in violation of requirements; said report shall describe the nature, cost, and scheduling of all action necessary to preclude such discharge.

3. Self-Monitoring Reports

Written reports shall be filed regularly for each calendar quarter (unless specified otherwise) and filed no later than the fifteenth day of the following quarter. The next quarterly report is due October 15, 1994. The reports shall be comprised of the following:

a. Letter of Transmittal:

A letter from the discharger transmitting self-monitoring reports should accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period and actions taken or planned for correcting any requirement violations. If the discharger has previously submitted a detailed time schedule for correcting requirement violations, a reference to this correspondence will be satisfactory. Monitoring reports and the letter transmitting reports shall be signed by a principal executive officer or a duly authorized representative of that person.

The letter shall contain a statement by the official, under penalty of perjury, that to the best of the signer's knowledge the report is true and correct.

b. Results of Analyses and Observations

(1) Results from each required analysis and observation shall be submitted in the quarterly self-monitoring regular reports. Results shall also be submitted for any additional analyses performed by the dischargers at the specific request of the Board. Quarterly water level data shall also be submitted in the quarterly report.

(2) The quarterly reports shall include the groundwater extraction rates from each extraction well, water level data from the extraction wells, the results of any aquifer tests conducted during the quarter.

(3) The quarterly reports shall include a discussion of unexpected operational changes which could affect performance of the extraction system, such as flow fluctuations, maintenance shutdown, etc.

(4) The quarterly report shall also identify the analytical procedures used for analyses either directly in the report or by reference to a standard plan accepted by the Executive Officer. Any special methods shall be identified and should have prior approval of the Board's Executive Officer.

(5) The discharger shall describe in the quarterly Self-Monitoring Report (SMR) the reasons for significant increases in a pollutant concentration at a well. The description shall include:

a) the source of the increase,

b) how the discharger determined or will investigate the source of the increase, and

c) what source removal measures have been completed or will be proposed.

(6) Original lab results shall be retained and shall be made available for inspection for six years after origination or until after all continuing or impending legal or administrative actions are resolved.

(7) A map or maps shall accompany the quarterly report, showing all sampling locations and plume contours to final cleanup levels.

(8) The discharger shall describe in the quarterly monitoring report the effectiveness of the actions taken to regain compliance if compliance is not achieved. The effectiveness evaluation shall include the basis of determining the effectiveness, water surface elevations and water quality data.

(9) The annual report shall be combined with the fourth quarter regular report and shall include cumulative data for the current year. The annual report for December shall also include minimum, maximum, median, and average water quality data for the year, a summary of water level data, and GC/MS results. The report shall contain both tabular and graphical summaries of historical monitoring data.

d. SMP Revisions:

Additional long term or temporary changes in the sample collection frequency and routine chemical analysis may become warranted as monitoring needs change. These changes shall be based on the following criteria and shall be proposed in a quarterly SMR. The changes shall be implemented no earlier than 45 days after the self-monitoring report is submitted for review unless approved in writing.

Criteria for SMP revision:

(1) Discontinued analysis for a routine chemical parameter for a specific well after a two-year period of below detection limit values for that parameter.

(2) Changes in sampling frequency for a specific well after a two-year period of below detection limit values for all chemical parameters from that well.

(3) Temporary increases in sampling frequency or changes in requested chemical parameters for a well or group of wells because of a change in data needs (e.g., evaluating groundwater extraction effectiveness or other remediation strategies).

(4) Add routine analysis for a chemical parameter if the parameter appears as an additional chromatographic peak in three consecutive samples from a particular well.

(5) Alter sampling frequency based on evaluation of collective data base.

D. DESCRIPTION OF SAMPLING STATIONS

All existing and future monitoring and extraction wells as appropriate. See Table I and Figure 2 (attached) for monitoring and extraction wells installed at the time of the adoption of this SMP.

E. SCHEDULE OF SAMPLING AND ANALYSES

1. The schedule of sampling and analysis shall be that given in Table I (attached).

2. In addition, if a previously undetected compound or peak is detected in a sample from a well, a second sample shall be taken within a week after the results from the first sample are available. All chromatographic peaks detected in two consecutive samples shall be identified and quantified in the quarterly report.

3. Groundwater elevations shall be obtained on a quarterly basis from all wells at the site and submitted in the quarterly report with the sampling results.

4. Well depths shall be determined on an annual basis and compared to the depth of the well as constructed. If greater than ninety percent of screen is covered, the discharger shall clear the screen by the next sampling.

I, Steven R. Ritchie, Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedure set forth in this Regional Board's Resolution No. 73-16 in order to obtain data and document compliance with site cleanup requirements established in Regional Board Order No. 94-130

2. May be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the discharger, and revisions will be ordered by the Executive Officer or Regional Board.

3. Was adopted by the Board on September 21, 1994

Lawrence P. Kolb
for

Steven R. Ritchie
Executive Officer

Attachments:
Table 1 - Sampling Schedule
Figure 1 - Site Vicinity
Figure 2 - SMP and other wells

TABLE 1
SELF MONITORING PROGRAM
SAMPLING SCHEDULE
HEWLETT-PACKARD 640 PAGE MILL ROAD
VARIAN ASSOCIATES 601 CALIFORNIA AVENUE
HEWLETT-PACKARD 395 PAGE MILL ROAD

WELL NUMBER	8010 + Freon	8020+Acetone	8240 + Freon (1)	8270 or TPH
017B	S		A	
F21A1U	Q		A	
F22A1U	Q		A	
F23A	Q		A	
O27A1	S		A	
O28A1	Q	S	A	8270, A
F29A1U	S		A	
F30A1U (2)	Q		A	
F32A	S		A	
F33B			A	
F34A	Q		A	
F35B	S		A	
F36A	Q		A	
F37A	S		A	
F38A	S		A	
F39A	Q		A	
F40A	Q		A	
F42A1	Q		A	
F43A1U (2)	Q		A	
F44A	Q		A	
F45A1U (2)	Q	Q	A	
F46A1	Q		A	
F49A1	Q		A	
F51A1	S		A	

WELL NUMBER	8010 + Freon	8020+Acetone	8240 + Freon (1)	8270 or TPH
O52A2	Q	S	A	
F53A1U	S		A	
F54A1U	S		A	
F57A1U	Q		A	
F58A	S		A	
F59A1U	Q		A	
F61A1U	Q		A	
F62A1	Q		A	
F63A1U/A1	Q		A	
F64A1	Q		A	
F65A1U	Q		A	
F66A			A	
O67A2	S		A	
O68A1	Q	Q	A	
O69A2D			A	
O70A1	Q		A	
F73A1	Q		A	
F74A	Q		A	
F75A1U	Q		A	
F76A2 (3)	Q		A	
F77A1U (3)	Q		A	
F78A1	Q		A	
F79A2D	S		A	
F83A1U	Q		A	
F84A1	S		A	
F85A1	Q		A	
F86A2			A	
F87A2	S		A	
F88A1U	Q		A	

WELL NUMBER	8010 + Freon	8020+Acetone	8240 + Freon (1)	8270 or TPH
F89A	Q		A	
F90A1U	Q		A	
F91A1	S		A	
F92A2	S		A	
F93A1U	S		A	
F95A	S		A	
F97A	Q		A	
F98A	Q		A	
O100B			A	
F101B			A	
F102B	S		A	
F103B	S		A	
O104A1			A	
O105A2	S	S	A	
F106A1	S	S	A	
F107A2	S	S	A	
O108A1	S	S	A	
O109A2	S	S	A	
O110A1	Q	S	A	
O111A2	Q	S	A	
O112A1	Q	S	A	
O113A2	Q	S	A	
O114A2	Q	S	A	
O115A1	Q	S	A	
O116A1	Q	S	A	8270, Q
O117A2	Q	S	A	8270, S
O118B	Q	S	A	8270, A
O119A1	Q	S	A	8270, S
O120A2	Q	S	A	8270, S

WELL NUMBER	8010 + Freon	8020+Acetone	8240 + Freon (1)	8270 or TPH
O121A2	S	S	A	
O122A2	S	S	A	
F123A1	Q		A	
F124A2	Q		A	
F125A1	Q		A	
F126A2	Q		A	
F127A1	Q		A	
F128A	S		A	
F129A1	S		A	
F130A1U	Q		A	
F131A1	Q		A	
F132A2	S		A	
F133B	S		A	
F134A1	Q		A	
F135A1	Q		A	
F136A1	S		A	
F137A1	S		A	
F141A1U	Q		A	
F142A1	Q		A	
F143A1U	Q		A	
F144A2	Q		A	
F145A1	Q		A	
F146A1U	Q		A	
F147A1	Q		A	
EW-4	Q		A	
EW-5	Q		A	
EW-6	Q		A	
EW-7	Q		A	
EW-8	Q		A	

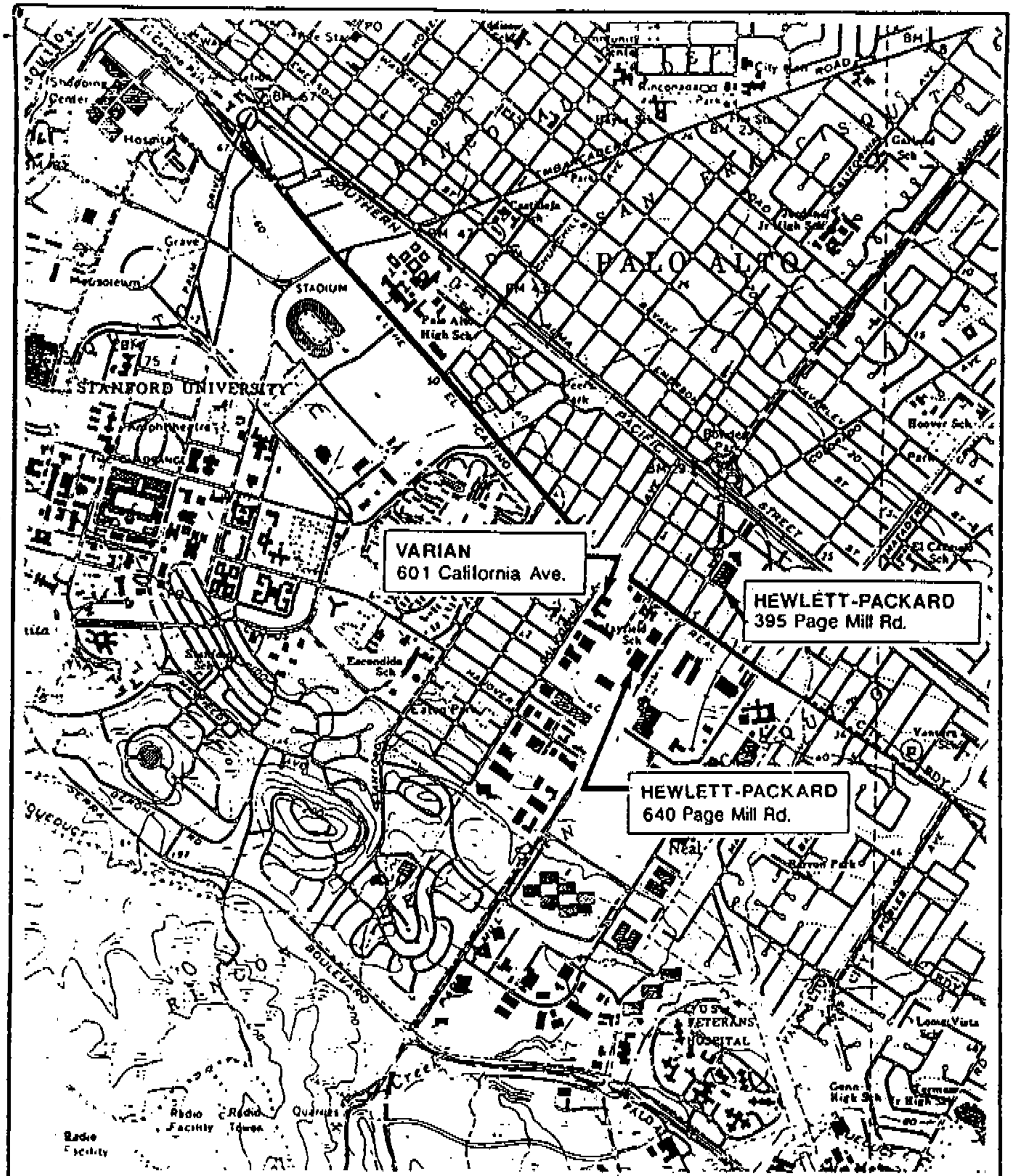
WELL NUMBER	8010 + Freon	8020+Acetone	8240 + Freon (1)	8270 or TPH
EW-9	Q		A	
EW-10	Q		A	
EW-11	Q		A	
EW-13	Q		A	
V8-1	Q		A	
V8-2	Q	S	A	
V8-2X	Q		A	
V8-3	Q		A	
V8-4	Q		A	
V8-5	Q		A	
V8-6	S		A	
V8-7	Q	S	A	
V8-8	Q		A	
V8-8X	Q		A	
V-9	S		A	
V-9X	S		A	
V-10	S		A	
V8-13B	S		A	
V8-14X	Q		A	
V8-22	Q		A	
V-23	Q		A	
V-33A2D	S		A	
W-3A1U	Q		A	
W-4A1U/A1				TPH, A (4)
W-5A1	Q		A	
W-6A1U	S		A	
W-7A1U	Q		A	
W-8A1U	S		A	TPH, A (4)
W-9A1U/A1	S		A	

WELL NUMBER	8010 + Freon	8020+Acetone	8240 + Freon (1)	8270 or TPH
W-10A1U	Q		A	
W-11A1U	S		A	TPH, A (4)
W-12A1U	Q		A	
W-13A2	Q		A	
W-14A1U/A1	Q		A	
W-16A1	Q		A	
W-17A2	Q		A	
W-19A2	S		A	
W-20B	Q		A	
BP-3 (3)	Q		A	
BW-4	S		A	
MB-2	Q		A	
SH-1	Q		A	
VB-1	Q		A	
OEU-MANHOLE			A	

Q = quarterly
S= semiannually
A = annually
8010 + Freon = EPA method 8010 and Freon 113
8020 + Acetone = EPA method 8020 and Acetone
8240 = EPA method 8240 + Freon 113
8270 = EPA method 8270
TPH = EPA method 8015 and 5520/413

Well Numbering scheme
O = 640 on-site well
F = COE or perimeter well
EW = Extraction well, HP associated or off-site
X = Extraction well, Varian 601 associated
V = Varian 601 associated well
W = HP 395 on-site well
A = A zone well
A1 = A1 zone well
A1U = A1 Upper zone well
A2 = A2 zone well
A2D = A2 Deep zone well
B = B zone well
OEU = Oregon Expressway Underpass

(1) Annual EPA Method 8240 analysis is in place of (and not in addition to) quarterly EPA Methods 8010 and 8020 analysis.
(2) Not currently sampled; resume sampling when the A1U zone resaturates.
(3) Not currently sampled; resume sampling if access is obtained.
(4) Sample only if TPH is left behind in soil at concentrations greater than 100 parts per million after site redevelopment.



0 1200 Feet

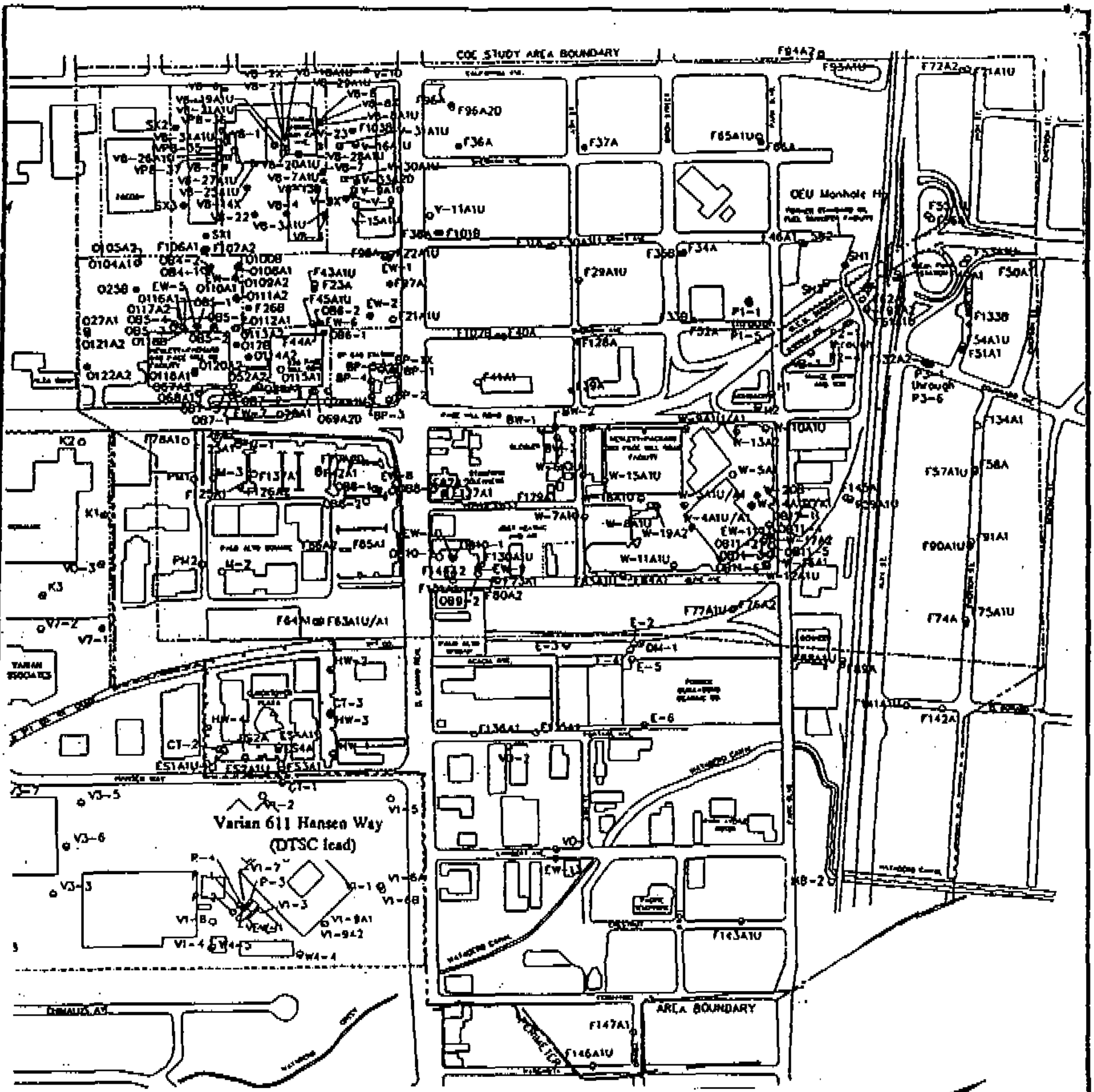
0 1/2 Mile

N

STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

Hewlett-Packard 640 Page Mill Road
Varian Associates 601 California Avenue
Hewlett-Packard 395 Page Mill Road
Palo Alto
Figure 1 Site Vicinity

DRAWN BY: jmh	DATE: 9/21/94	DRWG.NO. 1



N

0 200 400
SCALE IN FEET

EXPLANATION

W-12A1U	A1U Zone Monitoring Well
W-4A1U/A1	A1U/A1 Zone Monitoring Well
O28A	A Aquifer Monitoring Well
F21A1	A1 Zone Monitoring Well
F98A2	A2 Zone Monitoring Well
F26B	B Aquifer Monitoring Well
EW-2	Ground Water Extraction Well
VB-29A1U	Vapor Extraction System Well

NOTE:
"D" suffix indicates well screened in deep subunit.
"OB" prefix indicates observation well for extraction pumping.
"P" prefix indicates observation well for Oregon Expressway Subdrain pumping.

ENVIRON

STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

Hewlett-Packard 640 Page Mill Road
Varian Associates 601 California Avenue
Hewlett-Packard 395 Page Mill Road
Palo Alto
Figure 2 SMP and Other Wells

DRAWN BY:	DATE: 9/21/94	DRWG. NO. 2

California Regional Water Quality Control Board
San Francisco Bay Region

HEWLETT-PACKARD 640, 395 PAGE MILL ROAD AND VARIAN 601 CALIFORNIA AVENUE SITES

Fact Sheet 5 July 1994

Regional Water Board Announces Proposed Cleanup Plan

The California Regional Water Quality Control Board (Regional Board) is considering a Proposed Plan and Tentative Order for soil and groundwater cleanup by Hewlett-Packard Company and Varian Associates, Inc. in Palo Alto, California (Figure 1). The Proposed Plan includes cleanup actions by each of the companies at their respective sites and a combined cleanup effort off-site. These are the Hewlett-Packard sites at 640 and 395 Page Mill Road and the former Varian site at 601 California Avenue (Figure 2).

The companies have completed a Remedial Investigation (RI) of chemical releases to soil and groundwater in the California-Olive-Emerson (COE) Area and Perimeter Area (the "Area") shown on Figure 2. The EPA has also prepared a *Baseline Public Health Evaluation (BPHE)* to assess possible public health risk from the site. Based on these investigations, the companies have completed a Feasibility Study (FS) of cleanup options. The Cleanup Plan is designed to restore protect shallow groundwater as a potential source of drinking water by cleaning up contaminated soils at the Sites and groundwater both at the Sites and in the off-site area.

The purpose of the Fact Sheet is to summarize the cleanup standards and options under consideration by the Regional Board and to invite community members to inform the Regional Board of their preferences and concerns.

SITE BACKGROUND AND HISTORY

This section discusses site history, on-site soil investigations, and interim cleanup actions that have been undertaken to clean up soils and groundwater in the vicinity of on-site source areas. The 640 Page Mill Road Site is a federal Superfund site, which also includes the off-site area defined in Figure 2. The former Varian 601 California

Words appearing in *italics* in this fact sheet are defined in the Glossary on page 9.

Public Review and Comment Period

The Regional Board welcomes your participation and encourages you to review and comment on the Proposed Plan during the public comment period: July 20 through August 19, 1994. All comments received by the Board will be responded to and considered in the selection of the remedy. Copies of fact sheets, the Remedial Investigation, Feasibility Study, Baseline Public Health Evaluation, and other site-related documents are available at the information repositories identified on page 9.

You can send written comments postmarked no later then August 19, 1994 to:

John Hillenbrand
Case Manager
Regional Water Quality Control Board,
2101 Webster Street, Suite 500
Oakland CA 94612

Community Meeting

Residents of Palo Alto and other interested people are invited to an upcoming meeting regarding investigation and proposed cleanup activities at the Hewlett-Packard site. Board staff will report on the cleanup alternatives and the Board's proposed remedies.

Tuesday July 26, 1994
7:00 pm
Escondido School
890 Escondido Road
Stanford, California

You will have a chance to ask questions and comment on the cleanup alternatives at the meeting. Comments may also be submitted in writing during the comment period.

Avenue and the HP 395 Page Mill Road Sites are not part of the federal Superfund site. The Regional Board is the lead agency regulating the cleanup under a formal agreement with the U.S. Environmental Protection Agency (EPA). Investigations at the Varian 611 Hansen Way Site, located south of the Area, are under the oversight of the California EPA, Department of Toxic Substances Control (DTSC).

Hewlett-Packard 640 Page Mill Road

The HP 640 Page Mill Road Site is owned by Stanford University. The Site was first developed in 1955. The Palo Alto Engineering Company occupied the building from January 1955 until October 1962. HP occupied the building in November 1962 and manufactured semiconductors at the Site from 1964 to 1986, when operations ceased. The facility was inactive until 1992, when the original buildings were demolished. Construction of a new office building was completed in April 1994.

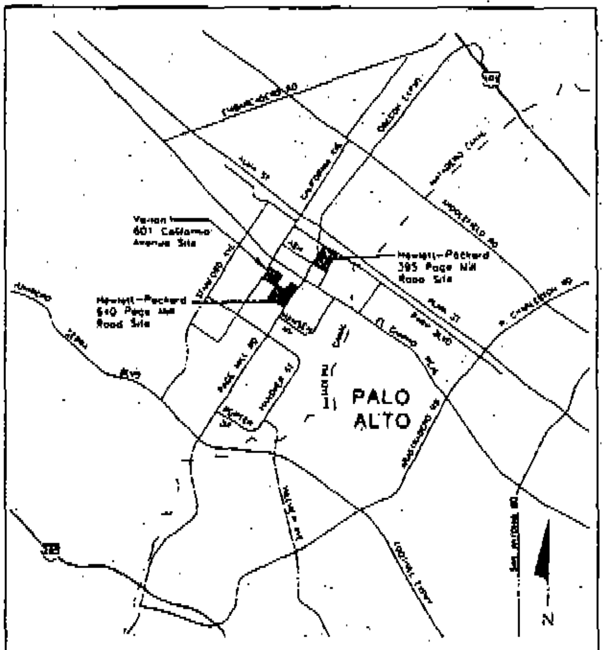


Figure 1.

The principal source of soil and groundwater contamination at this facility was an underground tank used to store waste solvents. The tank was removed in July 1981, and 810 cubic yards of soil were excavated from the former tank area in the fall of 1987. Other likely sources of chemical releases to soil included a below grade acid neutralization sump, transport piping, and a centrifuge that was used for gallium arsenide and other wastes. As part of the closure of these units between November 1987 and February 1988, 22 cubic yards of soil were excavated. Since April 1991, extensive remedial measures have been conducted in conjunction with site redevelopment. These included additional excavation of 10,000 cubic yards of soil and installation of a soil venting system to remediate *volatile organic compounds (VOCs)* remaining in soils in the vicinity of the former underground tank.

Groundwater extraction has been conducted at the 640 Page Mill Road Site in the vicinity of the former underground tank since February 1987. In addition, two shallow extraction wells operated at the former Mayfield School property until mid-1991, when operations ceased due to declining water levels.

Former Varian 601 California Avenue

The 601 California Avenue Site is owned by Stanford University. The 601 California Avenue Site was originally leased from Stanford by the General Electric Company (GE) from 1954 to 1965. GE conducted research and manufactured electron tubes and other devices at the site. Varian leased and occupied the site from 1965 to 1991 and manufactured vacuum tubes and solid state night vision tubes and devices. In February 1991, the operations were sold, and the 601 California Avenue Site is currently occupied by Intevac.

Extensive investigations have been ongoing at the former Varian 601 California Avenue Site since 1986. The primary source area identified at the site is located in the courtyard of the building, where a dry well was discovered in 1990 and subsequently removed along with surrounding soil. A second source area was identified on the southern side of the building, where elevated levels of *VOCs* have been found in soil and groundwater. Both of these areas are being remediated by a soil venting system that was installed in June 1991 and expanded in June 1992. The system remains in operation and is being further expanded in Summer 1994.

Groundwater has been extracted from a well located within the courtyard since September 1987. Two additional extraction wells began operation in March 1992 and August 1992, respectively. A fourth extraction well will begin operation following start-up of new extraction wells at the adjacent HP 640 Page Mill Road Site.

Hewlett-Packard 395 Page Mill Road

The HP 395 Page Mill Road Site is owned by Hewlett-Packard. The Site was developed and has been occupied by HP since 1942 and has housed various industrial operations related to the manufacture of electronic equipment. Current industrial activities include plastics molding, and fabrication and finishing of aluminum parts.

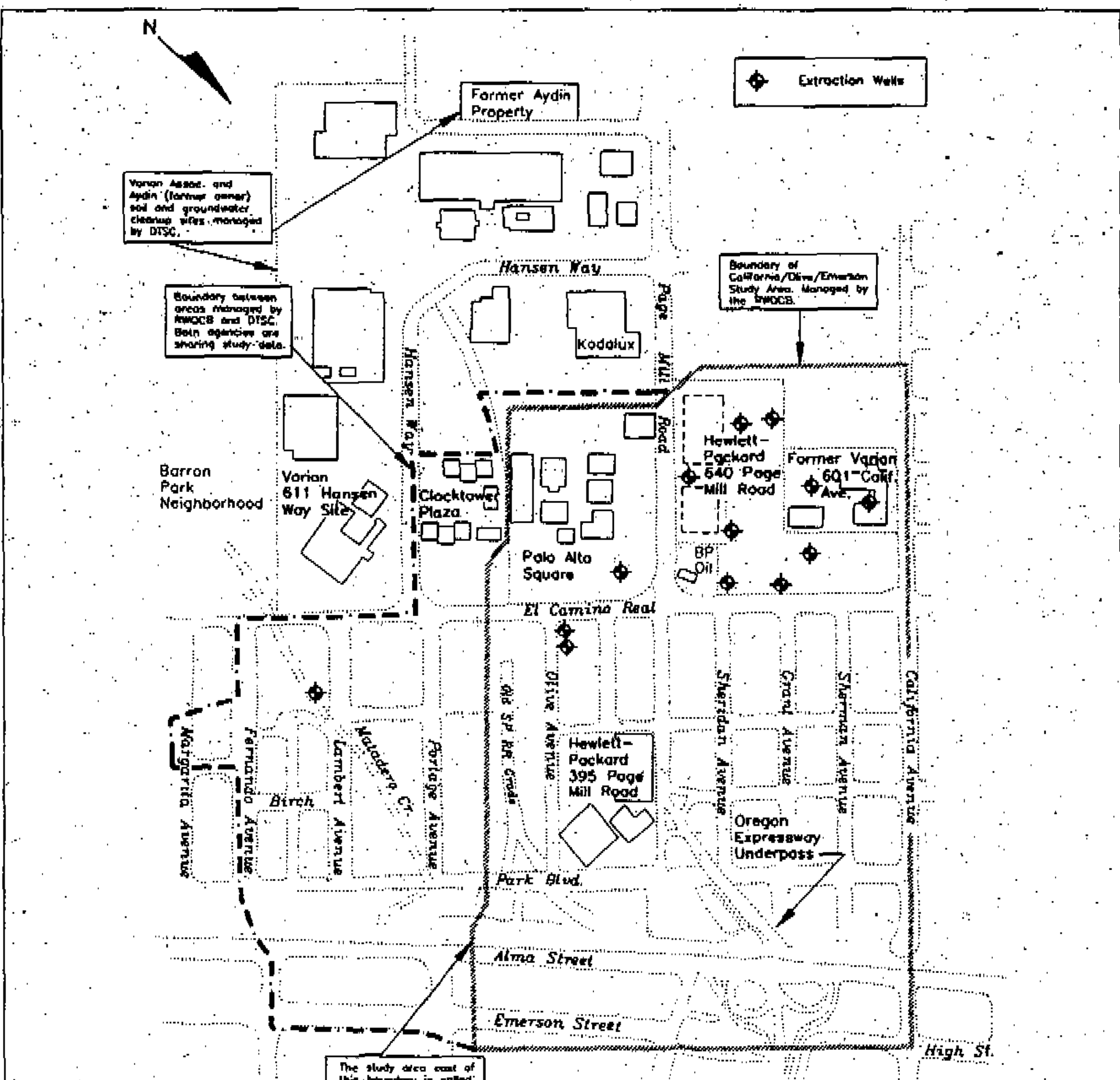


Figure 2.

Subsurface investigations were initiated at the 395 Page Mill Road Site to investigate an underground waste solvent storage tank that was taken out of service in 1982. Extensive investigations have been completed over the last decade to characterize the extent of chemicals present in vadose zone soils and groundwater. Based upon the results of these investigations, several remedial actions have been implemented, including operation of a soil venting system near the former underground waste solvent tank (from August 1987 through approximately January 1989), excavation of vadose zone soils from six areas of the Site that were found to contain total *VOC* concentrations above the soil remediation goal of 1 part per million, and recovery of a small amount of *dense, non-aqueous phase liquid (DNAPL)* that exists in one of the on-site observation wells.

Other Cleanup Sites

The Regional Board and a sister agency–The Department of Toxic Substances Control–oversee investigation and cleanup activities at several other sites in the Stanford Research Park. The largest site with contaminated groundwater affecting the area addressed in this fact sheet is the Varian 611 Hansen Way site. Contaminated groundwater from the 611 site is moving into the COE and Perimeter Areas. The Varian 611 site is currently in the process of having cleanup plans approved.

REMEDIAL INVESTIGATION RESULTS/INTERIM CLEANUP ACTIONS

A Remedial Investigation (RI) was conducted to characterize the nature and extent of chemicals in soil and groundwater, and interim cleanup actions have been undertaken at Hewlett-Packard and Varian Sites and within the off-site area. An overview of RI activities and interim cleanup actions associated with on-site soil at the Hewlett-Packard and former Varian Sites was presented above. Summaries of RI results and interim cleanup actions for groundwater in the entire study area are briefly discussed below.

Area of Study

The area of the groundwater investigation includes the area that has been designated the California-Olive-Emerson (COE) Study Area, because it is bounded by California Avenue to the west, Olive Avenue to the east, and Emerson Street to the north, and an adjacent area designated the Perimeter Area, which extends from Olive Avenue to Margarita Avenue east of Matadero Canal (see Figure 2).

Site Hydrogeology

The area of study is underlain by alluvial fan deposits associated with the San Francisquito Creek to the west and Matadero Creek to the east. Two primary water-bearing aquifers are identified within the alluvial fan deposits. These are termed the A Aquifer, which extends between approximate depths of 13 to 55 feet below ground, and the deeper B Aquifer, which was encountered below a depth of 60 feet below ground. The regional direction of groundwater flow is northeasterly, from the hills toward San Francisco Bay. Within the Area, groundwater gradients in the A Aquifer are affected by pumping from the Oregon Expressway Underpass (OEU) dewatering system, which draws groundwater toward the subdrain collection system, with localized deflections that are attributed to the distribution of coarse and fine-grained sediments.

Groundwater Quality

The principal chemicals of concern in groundwater within the Area are chlorinated *volatile organic compounds (VOCs)*. Trichloroethene (TCE) is the *VOC* most widely distributed and detected at the highest concentrations. *VOCs* are restricted vertically to depths less than 45 feet, or within the A *Aquifer*, except in two places; the immediate vicinity of the above-described former underground storage tank at the 640 Page Mill Road Site and the Clocktower Plaza area (Figure 2). The *VOCs* detected in the Clocktower Plaza location have been at concentrations above the *maximum contaminant levels (MCLs)*. The RI has shown that chemicals in groundwater do not extend beyond High and Emerson Streets to the north, California Avenue to the west, or beyond Margarita, Fernando, and El Carmelo Avenues to the east of Matadero Canal (Figure 2). The distribution of *VOCs* appears to be strongly influenced by hydraulic effects imposed by the long term operation of the OEU dewatering system.

Interim Remedial Measures (IRMs) for Groundwater

In addition to the above-described extraction wells that have been operated at 640 Page Mill Road, 601 California Avenue, and the former Mayfield School property, nine groundwater extraction wells were installed in late 1992 and early 1993 as part of an expanded remedial system that was approved by the Regional Board. The expanded extraction system located both on-site and off-site began operation in April 1994, along with another existing extraction well located at 601 California Avenue.

RESULTS OF THE PUBLIC HEALTH EVALUATION

A *Baseline Public Health Evaluation (BPHE)* is conducted at every site in accordance with Superfund regulations. The purpose of the BPHE is to evaluate the risk posed by the site prior to cleanup activities. The *BPHE* examines the chemical concentrations present at the site, and the possible routes and rates of exposure to humans. Once the potential risk from the site is established, judgements can be made as to which environmental laws and standards are applicable to the situation and what cleanup levels are appropriate.

Palo Alto's Water

The City of Palo Alto supplies drinking water to approximately 26,000 homes. Presently, 100% of the water comes from the San Francisco Water Department's Hetch Hetchy System. The City also has an emergency backup water supply system that relies on 2 wells owned and operated by the City. These wells are closely monitored by the City and none have ever been found to violate drinking water standards.

Questions regarding public water supplies in Palo Alto should be directed to Linda Clerkson of the Utilities Department at (415) 329-2229.

The *BPHE* for the Hewlett-Packard 640 Page Mill Road Superfund Site was prepared by EPA. Based on a determination by EPA that chemicals in groundwater that are emanating from the 395 and 640 Page Mill Road and 601 California sites have become co-mingled locally with other groundwater contamination plumes in the area, the *BPHE* represents a space regional BPHE for contaminated groundwater within the COE and Perimeter Areas.

The *BPHE* states that all areas of soil contamination within the COE Study Area and Perimeter Area have been or are in the process of being remediated. Therefore, EPA determined that a quantitative evaluation of potential risks associated with exposure to chemicals in soil was not warranted.

Using very protective assumptions, current and future exposure pathways were studied. The risk associated with each pathway is estimated using mathematical models and assumptions which are likely to provide a conservative risk assessment. Assumptions include no additional cleanup and a lifetime exposure.

Four potential exposure scenarios were developed in the *BPHE*, based on the potentially exposed populations, current uses of the site, and possible future uses of the site. These potential exposure scenarios are:

- Current On-site worker;
- Current Off-site resident;
- Future On-site resident; and
- Future Off-site resident.

Adult exposures were examined for all residential scenarios.

The findings of the *BPHE* suggest that potential human health risks, including potential carcinogenic and non-carcinogenic health effects, could exceed health protective levels if no cleanup actions are performed, based on evaluation of the hypothetical on-site land use exposure scenarios. In the future, if the site were converted to residential use and cleanup action was stopped, several exposure pathways of concern would exist which could pose carcinogenic and/or non-carcinogenic health risks.

These future possible pathways assume that:
1. Onsite areas would be developed for residential use,
2. The groundwater would be used for domestic purposes,
3. The current cleanup actions would be discontinued and no further cleanup actions would be taken.

Using these assumptions, many types of potential pathways exist but the only significant potential future exposure pathways are:

1. Ingestion of groundwater containing the chemicals of potential concern,
2. Inhalation of *VOC* vapors from the groundwater during showering and/or other domestic uses, and
3. Inhalation of *VOC* vapors inside buildings originating from on-site groundwater.

Under the present City of Palo Alto zoning, the on-site and off-site industrial areas are expected to remain commercial/industrial. However, the *BPHE* assumes that future land use at the site could be residential.

Currently, groundwater from the shallow *aquifers* under the Area is not known to be used for domestic purposes. While use of the shallow groundwater in this Area for domestic purposes is highly unlikely due to deed restrictions and higher quality imported water, it is a potential source of drinking water. Therefore domestic use must be considered and protected.

The assumption that cleanup actions will not be implemented is intended only to provide a baseline for comparison. In fact, several cleanup actions have been implemented after EPA completed the *BPHE*, and additional actions are planned in the near future as described below.

DEVELOPMENT OF CLEANUP OBJECTIVES

The Remedial Investigation, Feasibility Study and the *Baseline Public Health Evaluation* have all been completed in conformance with federal Superfund requirements which are intended to protect human health and the environment. In addition to the federal Superfund requirements discussed thus far, there are other requirements imposed by federal and state laws and regulations that are considered *"applicable or relevant and appropriate requirements" (ARARs)* to the cleanup action at this site.

One of these *ARARs* is the State Water Resources Control Board Policy Number 68-16 which states that "the highest water quality consistent with the maximum benefit to the people of the state will be maintained". This includes protecting the potential to use the groundwater in the area as a drinking water resource. Even though the shallow groundwater affected by the site is not currently being used for drinking water, it is a potential drinking water source and must be protected as such. Therefore, the groundwater cleanup standards are proposed at state and federal *"Maximum Contaminant Levels" (MCLs)* for drinking water (shown in Table 1).

Table 1. Groundwater Remediation Goals for Chemicals of Concern

PARAMETER	GROUNDWATER REMEDIATION GOAL (ug/liter)
Acetone	3,500*
Benzine	1
1,1-dichloroethane (1,1-DCA)	5
1,2-dichloroethane (1,2-DCA)	0.5
1,1-dichloroethane (1,1-DCE)	6
cis-1,2-dichloroethene (cis-1,2-DCE)	6
trans-1,2-dichloroethane (trans-1,2-DCE)	10
Methylene Chloride	5
Tetrachloroethene (PCE)	5
1,1,2-trichlorethane (1,1,1-TCA)	200
1,1,2-trichlorethane (1,1,2-TCA)	3
Trichlorethene (TCE)	5
Freon 113	1,200
1,2-Dichlorobenzine	600
1,2,4-Trichlorobenzine	70

Remediation goal is either the federal or California Maximum Contaminate Level (MCL), whichever is lowest.
*No *ARARs* identified. Remediation goal based on EPA Health Effects

There is no federal or state *MCL* for acetone; therefore, this remedial goal was set at a concentration which is considered health-protective, based on acetone toxicity characteristics published by the EPA. *The Baseline Public Health Evaluation* indicates that cleanup to *MCLs* will be protective of human health and the environment.

There are no *ARARs* for contaminated soil. However, a Regional Board policy of cleanup to 1 part per million total *VOCs* for soils is proposed as the soil cleanup standard for the site. This goal is designed to conservatively protect human health and the environment by limiting the potential for chemical migration to groundwater.

DEVELOPMENT OF CLEANUP ALTERNATIVES

The Regional Board required HP and Varian to submit a Feasibility Study report which develops and evaluates alternatives for final cleanup at the site. The first step in selecting an alternative for final cleanup is to identify all the possible options to implement a cleanup. Once all the options have been identified, an assessment was conducted to choose the best alternatives. Cleanup alternatives were developed separately for vadose zone soils at the individual Sites and for the off-site groundwater plume.

Hewlett-Packard 640 Page Mill Road

- *Alternative 1*: No Further Action; and
- *Alternative 2*: Soil Venting with Vapor Phase Granular Activated Carbon (GAC) Treatment of Extracted Soil Vapors.

Former Varian 601 California Avenue

- *Alternative 1*: No Further Action; and
- *Alternative 2*: Soil Venting with Vapor Phase *Granular Activated Carbon (GAC)* Treatment of Extracted Soil Vapors.

Remedial alternatives that were previously evaluated in detail at the former Varian 601 California Avenue Site, in addition to those listed above, included in-situ bioremediation and excavation.

Hewlett-Packard 395 Page Mill Road

- *Alternative 1*: No Further Action;
- *Alternative 2*: Soil Venting with Vapor Phase *Granular Activated Carbon (GAC)* Treatment of Extracted Soil Vapors; and
- *Alternative 3*: Excavation and Off-Site Treatment and/or Disposal.

Groundwater

Three different remedial alternatives for groundwater extraction, treatment, and disposal (*GW-1*, *GW-2*, and *GW-3*) were developed for detailed FS evaluation. These alternatives are differentiated primarily on the basis of different scenarios for groundwater extraction.

Alternative GW-1 is identified as the No Further Action Alternative, and consists of continued operation of the OEU and operation of the above-described existing groundwater extraction wells that were installed as *Interim Remedial Measures (IRMs)* for the Area.

Alternative GW-2 consists of continued operation of the OEU and operation of the existing IRM wells, plus construction and operation of new wells added primarily near the boundaries of the areas containing chemicals of concern in groundwater.

Alternative GW-3 includes the OEU and all of the wells included in Alternative GW-2, plus construction and operation of additional new wells located in selected areas of elevated chemical concentrations.

For each of these alternatives, extracted groundwater will be treated via air stripping with GAC treatment of air stripper emissions. The treated groundwater will be reused for irrigation and non-potable consumption, or discharged to the sewage treatment plant, or surface water. Extracted groundwater will be pumped to separate treatment systems located at 640 Page Mill Road, 601California Avenue, 395 Page Mill Road, and 611 Hansen Way.

EVALUATION OF CLEANUP ALTERNATIVES

Each of the above-listed cleanup alternatives were evaluated using the following Superfund assessment criteria:

1. Overall Protection of Human Health and the Environment;
2. Compliance with Appropriate State and Federal laws (known as *ARARs*);
3. Long-term Effectiveness and Permanence;
4. Reduction in Toxicity, Mobility, or Volume through Treatment;
5. Short-term Effectiveness;
6. Implementability;
7. Cost;
8. Federal, State, and Public Agency Acceptance; and
9. Community Acceptance.

A summary of the evaluation, excluding items 8 and 9 is provided in Table 2. Evaluation of these two items will be done after the public comment period.

RECOMMENDED ALTERNATIVE

Regional Board staff recommends the following alternatives for each of the three Sites and for the off-site groundwater plume.

Table 2. Comparative Analysis of Alternatives

REMEDIAL ALTERNATIVE	GW-1	GW-2	GW-3
Extraction Scenario	E-1	E-2	E-3
Treatment	Air Stripping, Vapor-Phase GAC	Air Stripping, Vapor-Phase GAC	Air Stripping, Vapor-Phase GAC
Disposal	Reuse, discharge to POTW & storm drain	Reuse, discharge to POTW & storm drain	Reuse, discharge to POTW & storm drain
EVALUATION CRITERION:			
Overall Protection of Human Health and the Environment	Protective of human health, but may not provide adequate protection of the environment.	Protective of human health and the environment.	Protective of human health and the environment.
Compliance with ARARs	A portion of the A1U Zone is not actively remediated. Meets other ARARs.	Meets ARARs.	Meets ARARs.
Long-Term Effectiveness and Permanence	Limited long-term effectiveness, because some chemicals might not be captured by extraction system.	Residual levels of chemicals will not impair human health or the environment.	Residual levels of chemicals will not impair human health or the environment.
Reduction of Toxicity, Mobility, or Volume	Toxicity of chemicals reduced by regeneration or disposal of carbon, but not all VOCs are captured in extraction.	Toxicity of chemicals reduced by regeneration or disposal of carbon. Volume and mobility reduced by extraction.	Toxicity of chemicals reduced by regeneration or disposal of carbon. Volume and mobility reduced by extraction.
Short-Term Effectiveness	No deleterious short-term effects.	Potential health risks during well construction; can be minimized by health and safety procedures and access restrictions.	Potential health risks during well construction; can be minimized by health and safety procedures and access restrictions.
Implementability	Fully implementable.	Access restrictions may limit well construction implementability in three locations.	Access restrictions may limit well construction implementability in five locations and treatment system construction at Sheridan/Ash.
Present Worth Cost	$14,513,000	$15,474,000	$17,027,000
State Acceptance	To be determined	To be determined	To be determined
Community Acceptance	To be determined	To be determined	To be determined

Hewlett-Packard 640 Page Mill Road

The recommended cleanup measure for soils at the 640 Page Mill Road Site consists of soil venting and GAC treatment of the extracted vapors (Alternative 2). This alternative protects human health and the environment, complies with *ARARs*, is effective in both the long and short-term, reduces the toxicity, mobility, and volume of *VOCs*, and is cost effective. The recommended soil venting system, which was designed based upon pilot study results, consists of a network of 28 soil venting wells and 18 soil gas probes that were constructed in coordination with the new building construction project at the Site.

Former Varian 601 California Avenue

The recommended cleanup measure for soils at the 601 California Avenue Site consists of soil venting and *GAC* treatment of the extracted vapors (Alternative 2). This alternative protects human health and the environment, complies with *ARARs*, is effective in both the long and short-term, reduces the toxicity, mobility, and volume of *VOCs*, and is cost effective. Because *VOC* removal from one area of the Site is proceeding more slowly than in other Site areas, the soil venting system in this area is being expanded with the addition of two new soil venting wells and installation of a water extraction and conveyance system from five soil venting wells.

Hewlett-Packard 395 Page Mill Road

The recommended cleanup measure for soils at the 395 Page Mill Road Site consists of soil venting and *GAC* treatment of the extracted vapors within the three areas of the Site that contain *VOC* concentrations above the soil remediation goal (Alternative 2). These areas have been designated as Areas IV, V, and X. This alternative protects human health and the environment, complies with *ARARs*, is effective in both the long and short-term, reduces the toxicity, mobility, and volume of *VOCs*, and is cost effective. Horizontal soil venting systems that were recently constructed within Areas IV and V will be operated as the final remedy. Depending upon the timing of anticipated Site redevelopment activities, HP may choose to implement a soil excavation alternative within Areas IV and V, however, instead of soil venting. Soil venting wells will be constructed and operated to remediate soil within Area X, where *dense non-aqueous phase liquid (DNAPL)* recovery from one well is continuing.

Barron Park Association Foundation

A local community group–The Barron Park Association Foundation–has been consulted frequently on site investigation and cleanup activities over the past several years. The group has met monthly with HP, Varian, and Regional Board staff since November 1992. A EPA technical assistance grant supports the group's efforts. Please see page 9 on how to contact the group.

Groundwater

The recommended cleanup measure for groundwater within the Area is Alternative GW-2, which consists of groundwater extraction and treatment using air stripping and *GAC* adsorption. This is the cleanup alternative that has also been recommended by the Barron Park Association Foundation, a community organization that actively oversees the remediation efforts. This alternative protects human health and the environment, complies with *ARARs*, is effective in both the long and short-term, reduces the toxicity, mobility, and volume of *VOCs*, and is cost effective. Specific elements of the groundwater cleanup are shown on Figure 2 and described below:

- Treatment of groundwater by air stripping; treatment of air stripper emissions by vapor phase GAC; reuse of treated groundwater for irrigation and non-potable consumption to the extent possible, and discharge of excess groundwater either to the storm drain or sewage treatment plant (640 Page Mill Road and 395 Page Mill Road Sites);

- Operation of the air stripping system at the former Varian 601 California Avenue Site, expanded to include groundwater extraction from an additional well; followed by reuse of the treated groundwater for irrigation, and discharge of excess groundwater to the sewage treatment plant;

- Conveyance of groundwater from the Perimeter Area to a future air stripping system located at the Varian 611 Hansen Way Site, followed by reuse of the treated groundwater for irrigation, and discharge of excess groundwater to the storm drain; and

- Continued operation of the OEU subdrain.

Glossary

aquifer-subsurface layers of water bearing soil and rock which are capable of yielding significant volumes of groundwater.

applicable or relevant and appropriate requirements (ARARs)-regulations, laws or policies from all agencies that apply to a site and must be adhered to during remediation.

baseline public health evaluation (BPHE)-a site-specific evaluation done to determine the actual health effect chemicals could have on people.

dense non-aqueous phase liquid (DNAPL)-liquid contaminants that are denser than water and sink upon entering the groundwater zone.

granular activated carbon (GAC)-a form of crushed or hardened charcoal. GAC cleans up soil or groundwater by adsorbing and removing *VOCs*.

maximum contaminant level (MCL)-the maximum concentration of chemicals allowed in the groundwater that is considered safe to drink.

plume-a term which describes the areal extent of contamination in the groundwater.

volatile organic compounds (VOCs)-compounds that evaporate easily at normal temperatures. Some common *VOCs* include trichloroethylene (TCE), tetrachloroethylene (PCE), 1,1,1-trichloroethane (TCA), ethylene dibromide (EDB) and benzene.

Opportunity for Community Involvement

The public comment period on the cleanup alternative recommended by the Regional Board will run from July 20 to August 19, 1994 (Please see box on Page 1). During the comment period, there will be a public hearing and a community meeting at which the staff will present the recommended alternative and the public will have the opportunity to ask questions and make comments. The public hearing will be the regularly scheduled monthly Regional Board meeting beginning at 9:30 am Wednesday, July 20, 1994 at the BART Headquarters Building, 2nd floor Meeting Room, 800 Madison Street in Oakland. The community meeting will be held at 7:00 pm Tuesday, July 26, 1994 at the Escondido School, Stanford (Please see page 1). While the Board itself will be present at the public hearing, both meetings will be recorded and will be considered part of the official record. After the comment period, the staff will prepare a Responsiveness Summary to address the comments received on the cleanup alternatives and the Tentative Site Cleanup Requirements Order. Copies of the Responsiveness Summary will be sent to all persons who commented on the alternative and to persons who attend the community meeting. The final Site Cleanup Requirements Order is scheduled to be adopted after a final public hearing at the September 21, 1994 Regional Board monthly meeting.

For More Information

Call John Hillenbrand of the Regional Water Quality Control Board at 510 286-0671 or write to the:

Barron Park Association Foundation
3589 Laguna
Palo Alto CA, 94306

The Regional Board has established information repositories which contain Fact Sheets, The Proposed Plan, and other reference material pertaining to the investigation and cleanup at the Hewlett-Packard 640, 395 Page Mill Road and the Varian 601 California Avenue sites. The local information repository is:

The US Geological Survey Library
345 Middlefield Road, Building 3
Menlo Park, CA 94025

California Regional Water Quality Control Board
San Francisco Bay Region

Hewlett-Packard 640, 395 Page Mill Road and Varian 601 California Avenue sites

Fact Sheet 5 *July 1994*

This Fact Sheet:

- *Presents the results of the Remedial Investigation/Feasibility Study*
- *Evaluates the cleanup alternatives*
- *Recommends a cleanup alternative for the site*
- *Asks for community input to the selection of the cleanup alternative*

For more information, please call John Hillenbrand of the Regional Water Quality Control Board at 510 286-0671

RESULTS OF SOURCE
IDENTIFICATION INVESTIGATION

HEWLETT-PACKARD COMPANY
PALO ALTO FABRICATION CENTER
395 PAGE MILL ROAD
PALO ALTO, CALIFORNIA
MARCH 30, 1990

VOLUME I OF IV

McLaren

McLaren

March 30, 1990

Ms. Meredith Durant
Environmental Coordinator
Hewlett-Packard Company
1501 Page Mill Road, Building 5 Upper
Palo Alto, California 94304

Dear Ms. Durant:

RESULTS OF SOURCE IDENTIFICATION INVESTIGATION, HEWLETT-PACKARD COMPANY, PALO ALTO FABRICATION CENTER, 395 PAGE MILL ROAD, PALO ALTO, CALIFORNIA

Enclosed please find the report entitled "Results of Source Identification Investigation" for Hewlett-Packard Company dated March 30, 1990. This report was prepared in accordance with the "Revised Source Identification Proposal, Hewlett-Packard Company, 395 Page Mill Road, Palo Alto, California", dated November 20, 1989, and is intended to fulfill the source identification portion of the Site Cleanup Requirements issued by the Regional Water Quality Control Board on April 19, 1989 for the 395 Page Mill Road site.

If you have any questions regarding this report, please call.

Sincerely,

Bruce E. Ehleringer

Bruce E. Ehleringer, CEG 1114
Principal Hydrogeologist
Director RI/FS

Jean Hughes

Jean Hughes
Senior Soil Scientist

Enclosures

0307adg2.rpt

1135 Atlantic Avenue, Alameda, CA 94501 415.521.5200 FAX 415.521.1547

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EXECUTIVE SUMMARY

A comprehensive source identification investigation was conducted at the Hewlett-Packard Company 395 Page Mill Road facility. The investigation included soil gas sampling at 73 locations, the collection and analysis of over 250 soil samples from 75 borings,the collection and analysis of 22 grab water samples, and groundwater sampling and analyses of fifteen existing monitoring wells. All known or potential source areas were investigated and included potential discharge locations, such as storm drains, sanitary sewer lines, and sumps.

This investigation was conducted in accordance with the "Revised Source Identification Proposal, Hewlett-Packard Company, 395 Page Mill Road, Palo Alto, California", dated November 20, 1989, which was approved by the California Regional Water Quality Control Board (RWQCB), San Francisco Region, on January 4, 1990. This report presents the results of the source identification investigation and is intended to fulfill the source identification portion of the tasks outlined in the Site Cleanup Requirements issued by the RWQCB on April 19, 1989.

Soil samples were collected and submitted for laboratory analysis for volatile organic compounds (including both EPA Method 8240 and 8020 compounds), metals (including cyanide and aluminum), pH, and total petroleum hydrocarbons (including gasoline, diesel, and oil and grease). In addition two soil samples from one boring were collected and analyzed for polychlorinated biphenyls and pesticides.

Soil samples were collected continuously in all borings to provide lithologic information regarding subsurface site conditions. Based on the analytical and lithologic information gathered during this investigation the following conclusions can be drawn:

- Soil analytical values for metals in soils beneath the site are within a normal range of background concentrations and none of the concentrations detected exceed the STLC or TTLC criteria;

- Soil pH values at the site are within the neutral to alkaline range, these are typical values for soils in the Palo Alto area and are not in the range of pH which would allow for mobility of metals through soils;

- One hundred and fifty-two soil samples were analyzed for VOCs, of the 152 samples only five showed VOC concentrations equal to or greater than 500 ppb. Based on these data, in conjunction with the significant decrease in concentrations with depth, VOC migration has been limited by a laterally continuous clayey unit which underlies the site.

- TPH soils data indicate that shallow, localized areas exist where TPH compounds exceed the regulatory "guideline" values and additional investigation or remediation will be required.

Based on the findings from this investigation, the following work is recommended:

- Conduct additional VOC characterization of the two degreasers in Building 12 and soil in the vicinity of W-12; and

- Verify the lateral and vertical extent of TPH compounds detected in the sump adjacent to Building 7B and in the vicinity of former Buildings 7E and 7F.

INTRODUCTION

This report presents the results of a comprehensive source identification investigation conducted at the Hewlett-Packard Palo Alto Fabrication Center Facility, located at 395 Page Mill Road (395 PMR) in Palo Alto, California. The field investigation's were conducted January 8 through February 8, 1990, in accordance with the "Revised Source Identification Proposal, Hewlett-Packard Company, 395 Page Mill Road, Palo Alto, California", dated November 20, 1989.

PURPOSE OF REPORT

The Bay Area Regional Water Quality Control Board (RWQCB) issued Site Cleanup Requirements (SCR) for the 395 PMR site on April 19, 1989. Tasks associated with the cleanup requirements for the 395 PMR site include the following: a chemical use history, complete groundwater characterization, complete source identification, and a feasibility study. This report presents the results of the source identification investigation and is intended to fulfill the source identification portion of the SCR. The objectives of this investigation were to:

- Investigate all current and historical chemical use areas and potential sources of chemicals to soil and groundwater beneath the facility;

- Identify those areas which are sources of chemicals to soil; and

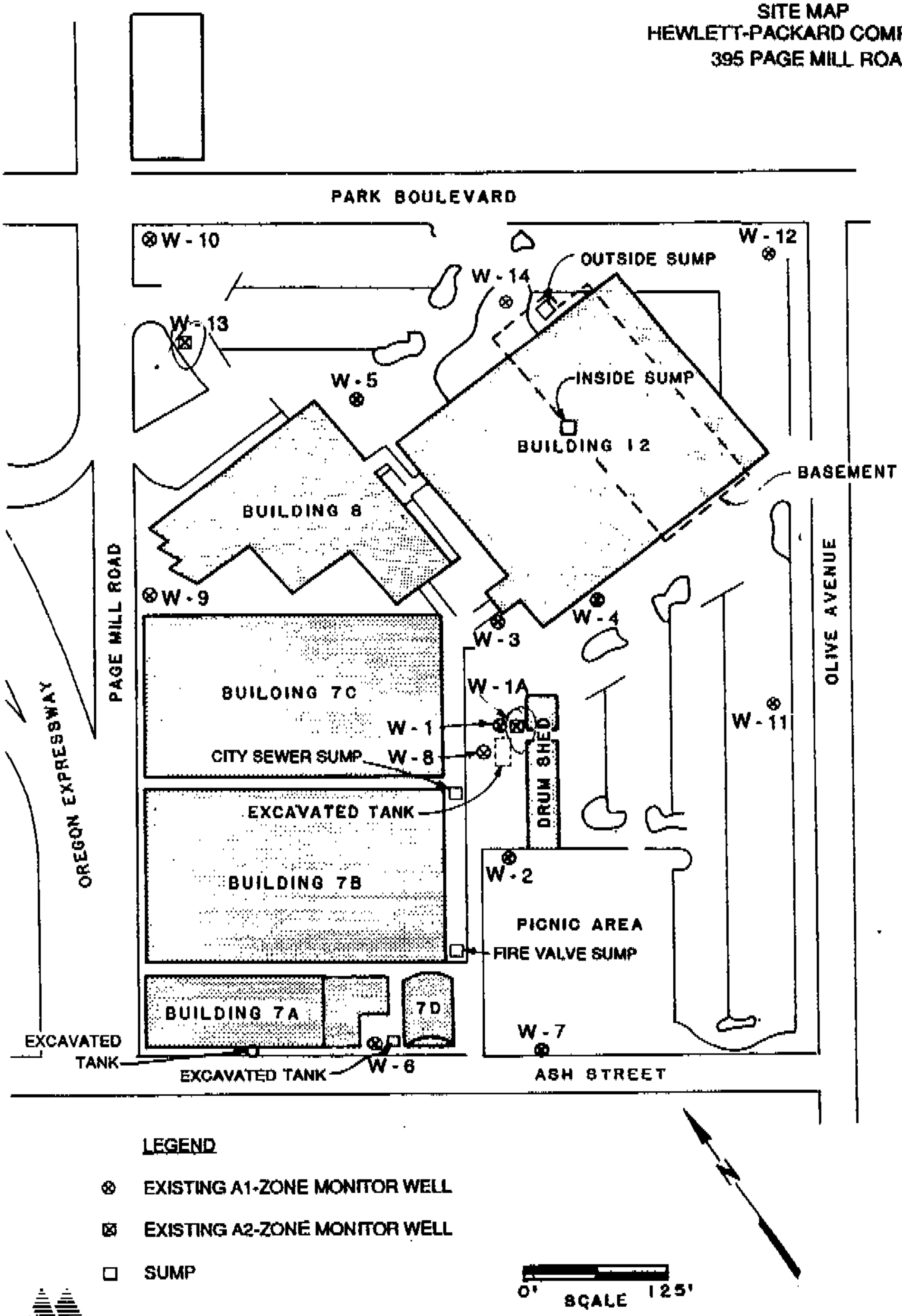
- Determine the principal chemicals which have entered the vadose zone at identified sources.

SITE DESCRIPTION

The 395 PMR facility is located in Palo Alto, California. The site is bordered by Page Mill Road, Olive Avenue, Ash Street, and Park Boulevard. The locations of current facilities and monitor wells at the 395 PMR site are shown in the Figure 1 Site map.

The 395 PMR facility was constructed and occupied by Hewlett-Packard beginning in the early 1940's and has housed various industrial operations relating to the manufacture of electronic equipment. Presently, industrial activities at the site include plastics molding, and fabrication and finishing of aluminum parts. The site is currently occupied by six buildings and a chemical storage shed. In addition to the current facilities at the site, three more buildings were previously located in the southeast portion of the site. These former building areas are now occupied by asphalt parking.

FIGURE 1
SITE MAP
HEWLETT-PACKARD COMPANY
395 PAGE MILL ROAD



McLaren Environmental Engineering

The six existing buildings on-site are identified as Buildings 7A, 7B, 7C, 7D, 8, and 12. The three buildings demolished were 7E, 7F, and 7G. A brief description of work activities conducted in these buildings is described below:

- Building 7A was constructed in 1942 and housed all Hewlett-Packard electronic manufacturing and assembly operations at that time. Historical operations reported to have occupied Building 7A include chemical milling, and semi-conductor and photo-conductor operations. This building currently houses offices, a model shop, and a model painting area.

- Building 7B was constructed in 1948. Historically, Building 7B has housed plating, painting, machining, assembly operations, and a model shop. Building 7B currently houses the Corporate Color (paint) Lab, silkscreening and film developing, welding, grinding, milling, riveting areas, and a machine maintenance area.

- Building 7C was constructed in 1948 and housed aluminum parts production, assembly and wiring operations, shipping and receiving, and quality control. Building 7C houses similar operations today, including shipping and receiving, quality control, limited sheet metal fabrication, and plastic molding operations.

- Building 7D, a military style quonset hut, was constructed in 1942. Building 7D was the original foundry building were die casting operations were conducted. Since the 1950's, Building 7D has been used as a garage for vehicle repair. Building 7D is currently used primarily for non-chemical storage.

  An enclosed storage building and a covered storage area are located between Building 7A and 7D. The enclosed storage building is reported to have historically stored hazardous materials, including hazardous waste.

- Buildings 7E, 7F, and 7G were constructed in the 1960's and demolished in the 1970's. Building 7E housed the die casting shop (which moved from its original location in 7D) and a machine shop. No other operations are reported to have been conducted in Building 7E. Building 7F was reported to have housed welding and carpentry shops. Building 7G is reported to have housed semi-conductor manufacturing, a machine shop, a paint shop, and a storage area. An open air drum storage area was located adjacent to Building 7G.

- The building known as Building 8 was constructed in 1954 and has been used as offices. Bench top research and development activities are also reported to have been conducted in Building 8. Building 12 and the chemical storage shed were constructed in 1976. Building 12 houses aluminum foundry die casting operations, sheet metal fabrication, painting operations, solvent and waste oil above-ground storage tanks, and a waste water treatment facility. The chemical storage shed is approximately 3,000 square feet in area and is used for chemical storage.

In addition to the above described current and former facilities, a 1,000-gallon underground waste solvent storage tank, a 500-gallon concrete clarifier, a 1,000-gallon holding tank and four sumps were previously located at the 395 PMR facility. The 500 gallon clarifier and 1,000 gallon holding tank were reported to receive wastewater from the chemical milling operations. The 1,000-gallon underground solvent tank was installed in 1978 northwest of the drum storage shed. Its purpose was storage of waste solvents from on-site activities. It was abandoned in 1982 and removed in July 1986. The concrete clarifier tank had a capacity of approximately 500 gallons and was located between Buildings 7A and 7D. This structure was installed in the 1960's and was removed in July 1986. The 1,000-gallon holding tank was located adjacent to Building 7A and parallel to Ash Street. This tank was removed in 1981. Two drainage sumps are located in the basement of Building 12. The purpose of these sumps is to prevent groundwater from entering the basement of Building 12 which is approximately 14 feet below ground surface. Groundwater was observed during recent drilling at a depth of approximately 23 feet below grade. Therefore, the Building 12 sumps are not in use at this time. Two additional sumps are located at the eastern end of Building 7B. One of these sumps houses valves for the fire main, and one drains to the city sewer.

REGIONAL HYDROGEOLOGY

The Hewlett-Packard 395 PMR site is situated on the western margin of the Santa Clara Valley in the San Francisquito Cone Geomorphic Province of the Central California Coast Ranges. The Santa Clara Valley is a structural depression, with water-bearing sediments occupying a series of structural troughs resulting from parallel faults in the Santa Clara Valley floor. The water bearing formations of the Santa Clara Valley are of two principal types, the younger valley alluvium and the older Santa Clara Formation.

The younger valley alluvium along the flanks of the Santa Clara Valley is composed of poorly sorted alluvial materials deposited by the many streams which drain the adjacent highlands. The 395 PMR facility overlies this younger valley alluvium. The deposits of the younger alluvium generally become progressively finer grained toward the central (lower) part of the valley.

The sedimentary basins of the Santa Clara Valley contain groundwater under confined, semi-confined, and unconfined conditions. Along the margins of the Santa Clara Valley, the exposed beds of the Santa Clara Formation and the surface deposits of the younger valley alluvium provide areas of natural groundwater recharge. Groundwater flows from these recharge areas to points of discharge in the central portion of the valley and beneath San Francisco Bay.

BACKGROUND

REVIEW OF PREVIOUS SOILS INVESTIGATIONS

In 1983, Applied Earth Consultants (AEC) conducted an investigation to evaluate soil and groundwater quality adjacent to the 1,000 gallon underground waste solvent tank located northwest of the chemical storage shed. The solvent storage tank was reported to have been constructed of mild steel with coal tar coating. Between May 1978 and May 1982 the tank is reported to have stored a variety of solvents, including methyl ethyl ketone, isopropanol, 1,1,1, trichloroethane, paint thinners, and hydraulic oil. In May 1982, the tank was "abandoned" and filled with water. A thin layer of oil (1/4") was poured on top of the water to prevent evaporation. The water level in the tank was monitored from May through November 1982 and showed no detectable change. AEC installed two monitoring wells (W-1 and W-1A) in November 1982. Both wells were constructed in one boring and soil samples were collected from the boring. Soil samples from depths of 20.0, 35.0, and 50.0 feet below grade were submitted for Priority Pollutant EPA Method 624 analysis at California Analytical Laboratory (CAL). TCE was detected in all three samples at concentrations of 40 parts per billion (ppb), 200 ppb, and 5 ppb, respectively. All of these samples were collected beneath the water table and were saturated.

A Phase I hydrogeologic investigation was conducted by Levine-Fricke in August 1985 to assess the source of solvents detected at the site, and to assess hydrogeologic conditions upgradient and downgradient of the underground solvent tank. Four monitoring wells (W-2, W-3, W-4 and W-5) were constructed by Levine-Fricke as part of the Phase I investigation. Soil samples were collected and submitted for laboratory analysis by EPA Method 624. Soil samples from W-5 did not show detectable levels of VOCs. Soil samples from W-2 (upgradient of the tank) at 10.0 feet below grade showed 170 ppb of toluene and 220 ppb of TCE. Saturated soil samples from 21.0 and 28.0 feet below grade showed 310 ppb and non-detectable levels of TCE, respectively. Saturated soil samples were collected from W-3 at 18.0, 24.0, and 32.0 feet below grade. TCE was detected at 290 ppb in the 18.0 foot sample. No VOC compounds were detected in the 24.0 or 32.0 foot samples. One soil sample was collected and submitted for laboratory analysis from 30.0 feet below grade in W-4. Toluene was detected at 150 ppb and TCE was detected at 180 ppb in this saturated soil sample. The soil data from this investigation indicated that a source of chemicals to groundwater may exist upgradient of the tank location.

Levine-Fricke conducted a Phase II hydrogeologic investigation in January 1986. Two monitoring wells (W-6 and W-7) were installed as part of the investigation. Soil samples collected during the drilling of these wells were submitted for VOC analysis (using EPA Method 8240), and petroleum hydrocarbon analysis (using freon extraction and a gas chromatograph with a flame ionization detector) to CAL. No VOCs or petroleum hydrocarbon compounds were detected in soil samples from W-6. Toluene was detected at 330 ppb in the saturated soil sample collected at 16.0 feet below grade. No petroleum hydrocarbons were detected in soil samples from W-7.

On July 8, 1986 Levine-Fricke removed the underground solvent storage tank. Upon removal, an approximately 1/16-inch diameter hole was observed in the bottom of the tank. Soil samples from 13.5 and 15.0 feet below grade were submitted to CAL for EPA Method 8240 analysis. Groundwater was encountered at 15 feet below grade, which indicates that the 15.0 foot soil sample was saturated. The following compounds were detected:

Depth (feet)	Compound	Concentration (ppb)
13.5	1,1,1-TCA	1800
	1,1 DCA	1800
	ethylbenzene	530
	PCE	13000
	toluene	3300
	acetone	13000
	2-butanone	30000
	4-methyl-2-pentanone	1000
	total xylenes	2400
15.0	1,1,1-TCA	870
	1,1-DCA	400
	ethylbenzene	180
	PCE	3400
	toluene	1900
	TCE	730
	total xylenes	800

In January 1987 McLaren constructed three monitoring wells (W-8, W-9, and W-10) to determine the lateral extent of chemical distribution in groundwater, to determine if semi-volatile compounds were present in soil adjacent to the former underground tank, and to determine groundwater flow directions throughout the site. Soil samples from 11.0, 14.0, and 15.5 feet below grade were collected from W-8 and submitted for laboratory analysis using EPA Method 8240. The 15.5 foot sample was saturated and was also analyzed for EPA Method 8270 compounds; none were detected. VOC concentrations in soil samples collected from W-8 were detected as follows:

Depth (feet)	Compound	Concentration (ppb)
11.0	1,1,1-TCA	130
	TCE	290
	PCE	810
	1,1-DCA	180

Depth (feet)	Compound	Concentration (ppb)
14.0	1,1,1-TCA	610
	TCE	950
	PCE	3100
	1,1 DCA	400
	vinyl chloride	390
	ethylbenzene	120
	toluene	730
	xylenes	520
	4-methyl-2-pentanone	450
15.5	1,1,1-TCA	620
	TCE	1000
	PCE	2400
	1,1-DCA	520
	toluene	380
	xylenes	240

Previous investigations by both McLaren and Levine-Fricke have indicated that the former underground waste solvent tank was a source of chemicals to underlying soils and groundwater. A soil-gas extraction system was operated for approximately 16 months (from September 1987 to January 1989). A soil boring was drilled next to well W-8 on September 26, 1988. The following compounds were detected in that soil boring.

Compound Detected	Depth (feet)	Concentration (ppb)
1,1,2-TCA	13	20
1,1,2-TCA	16	40
PCE	13	120
PCE	16	210
1,1,1-TCA	13	30
1,1,1-TCA	16	70
TCE	13	130
TCE	16	190
toluene	13	50
toluene	16	90
total xylene isomers	13	20
total xylene isomers	16	20

Based on the VOC concentrations of this soil boring the RWQCB approved Hewlett-Packard's request to discontinue operation of the vapor extraction system in January 1989.

In addition to the above investigations, soil sampling was conducted by Levine-Fricke and McLaren in the area between Building 12 and Building 8 in April 1987. The fire main located between the buildings was exposed during an excavation to replace a post indicator valve and discolored soil was observed in the sand backfill surrounding the fire main. A sample of the backfill material was collected and analyzed for volatile organic compounds (EPA Method 8240), and total petroleum hydrocarbons (Modified EPA Method 8015) by California Analytical Laboratories. No Method 8240 compounds were detected. The TPH analysis reported that stoddard solvent/mineral spirits (petroleum hydrocarbon compounds) were present in the sample at a concentration of 6,700 ppm. Based on field observations and instrumentation, all contaminated soil encountered was removed. Confirmatory sampling was conducted following excavation which verified that TPH concentrations in the remaining walls of the excavation were below detection limits.

In July 1989 McLaren installed three groundwater monitoring wells (W-11, W-12, and W-13) as part of a groundwater characterization investigation to further define flow patterns and evaluate groundwater quality in the eastern, northeastern, and northern portions of the site. Soil samples collected during drilling of the monitor well borings were analyzed for VOCs using EPA Method 8240 at Chemwest Analytical Laboratory. Analytical results of the six soil samples collected from the unsaturated zone are as follows:

Boring	Depth (feet)	Compound	Concentration (ppb)
W-11	7.5 - 8.0	TCE	21
		toluene	69
	15.0 - 15.5	TCE	15
W-12	9.0 - 9.5	PCE	630
	17.5 - 18.0	PCE	760
W-13	11.0 - 11.5	toluene	10
	19.5 - 20.0	toluene	86

Data from this investigation indicate that PCE is present in the unsaturated zone and in groundwater in the vicinity of well W-12. The source of the PCE compound was not identified during the groundwater characterization investigation. Soil analytical data from W-11 and W-13 do not indicate a source of the PCE detected in groundwater.

SOURCE AREA IDENTIFICATION INVESTIGATION

A total of 75 soil borings were drilled during this investigation to determine if chemicals occur in soil beneath potential source areas identified at the 395 PMR site. Table 1 summarizes the area investigated by each soil boring, the total depth of each boring, the sample depth intervals, photoionization device readings, and the type of analyses completed on selected samples. All soil boring and monitor well locations are shown on Figure 2. Soil boring locations and chemical use areas are shown on the floor plans for Buildings 7A, 7B, 7C, 7D, and 12 (Figure's 5 through 10). Hand auger and auger rig soil boring logs are included as Appendix A. The methods used for collecting soil samples and grab groundwater samples are discussed below.

SOIL AND GRAB GROUNDWATER SAMPLE METHODOLOGY

Soil drilling and sampling was conducted from January 8, 1990 through February 8, 1990. Forty-five of the 75 soil borings were completed with a hand auger because of insufficient clearance for a drill rig to access the areas inside and immediately adjacent to the buildings. The remaining 30 borings were drilled using a Mobile B-57 or Mobile B-53 drill rig equipped with 6 3/4-inch and 8-inch outside diameter hollow stem augers, respectively. The hand auger borings were completed to a depth of approximately 9.5 feet, the greatest depth obtainable using hand sampling equipment. The auger rig borings were completed at the first saturated zone encountered, ranging from 19.5 to 25.0 feet.

Prior to drilling, utility clearance activities were conducted at all of the proposed drilling locations. As part of the McLaren utility clearance protocol, the first five feet of each auger rig borehole was probed and sampled with a hand auger to verify the absence of utilities. Hand auger drilling was performed using a 3-inch diameter auger. Samples from hand augered borings were obtained using a 2-inch diameter drive sampler fitted with a 6-inch brass tube attached to a slide hammer. All reusable hand auger sampling equipment was thoroughly cleaned in a solution of trisodium phosphate and water and rinsed prior to use in each boring.

Auger rig drilling was performed by Cache Creek Drilling, Inc. and Aqua Science Engineers Drilling, Inc. Auger rig soil samples were collected continuously to the total depth of each boring using a California Modified Split-Spoon Sampler fitted with 6-inch brass tubes. Soil samples were collected for both soil description and laboratory analysis. All sampling equipment was cleaned in a solution of trisodium phosphate and water and rinsed thoroughly between each sample collection. Between soil borings all sampling equipment and the hollow stem augers were steam cleaned.

Soil from each soil boring was contained in a soil bin for temporary storage on-site. All fluids generated during equipment decontamination activities were contained in a Baker Tank for temporary storage on-site.

TABLE 1

SUMMARY OF SOIL BORINGS AND ANALYSES COMPLETED

Possible Source Area Addressed	Boring Designation[1]	Total Depth (feet)	Sample Depth (feet)	PID Readings (ppm)	Analyses Completed[2]
Building 7A					
Model Shop	HA-7A-1-1	9.5	0.5 - 1.0	0.7	pH, Metals, VOCs
			5.5 - 6.0	1.0	---[3]
			9.0 - 9.5	1.0	pH, Metals, VOCs
	HA-7A-1-2	7.5	1.0 - 1.5	0.3	pH, Metals, VOCs
			6.0 - 6.5	0.0	pH, Metals, VOCs
Transformer	HA-7A-2-1	9.5	6.5 - 7.0	0.0	pH, PCBs and Pesticides
			9.0 - 9.5	0.0	pH, PCBs and Pesticides
Former Holding Tank	HA-7A-3-1	7.5	1.0 - 1.5	1.0	pH, Metals, VOCs
			6.0 - 6.5	0.3	pH, Metals, VOCs
Former Chemical Milling Operations	HA-7A-4-1	8.0	2.0 - 2.5	1.0	pH, Metals
			7.0 - 7.5	3.5	pH, Metals
	HA-7A-4-2	7.5	2.0 - 2.5	3.0	pH, Metals
			7.0 - 7.5	3.0	---
	HA-7A-4-3	8.0	1.5 - 2.0	0.0	pH, Metals
			6.5 - 7.0	0.0	pH, Metals
Former Photo Conductor Production Area	HA-7A-5-1	9.5	1.5 - 2.0	0.0	pH, Metals, VOCs
			6.5 - 7.0	0.0	---
			9.0 - 9.5	0.0	pH, Metals, VOCs
	HA-7A-5-2	9.0	1.5 - 2.0	1.4	pH, Metals, VOCs
			6.5 - 7.0	1.9	---
			8.5 - 9.0	1.9	pH, Metals, VOCs

1 HA = Boring completed using a hand auger; SB = Boring completed using an auger rig.
2 TPH includes TPH/G, BTEX, TPH/D, and oil and grease analysis; metals are listed in Table 3.
3 Sample not analyzed.

0307adg6.tbl

TABLE 1

SUMMARY OF SOIL BORINGS AND ANALYSES COMPLETED
(continued)

Possible Source Area Addressed	Boring Designation[1]	Total Depth (feet)	Sample Depth (feet)	PID Readings (ppm)	Analyses Completed[2]
Building 7A					
Former Semi-Conductor Manufacturing	HA-7A-6-1	7.5	1.5 - 2.0	0.0	pH, Metals, VOCs
			6.5 - 7.0	0.0	pH, Metals, VOCs
	HA-7A-6-2	9.5	2.0 - 2.5	2.5	pH, Metals, VOCs
			7.0 - 7.5	3.0	---[3]
			9.0 - 9.5	3.0	pH, Metals, VOCs
	HA-7A-6-3	9.5	1.0 - 1.5	260.0	pH, Metals, VOCs
			6.0 - 6.5	440.0	---
			9.0 - 9.5	28.0	pH, Metals, VOCs
	HA-7A-6-4	7.5	1.5 - 2.0	1.8	pH, Metals, VOCs
			6.5 - 7.0	2.0	pH, Metals, VOCs
Building 7B					
Sump (City Sewer)	HA-7B-1A-1	9.5	1.5 - 2.0	3.0	pH, Metals, VOCs, TPH
			6.5 - 7.0	1.2	---
			9.0 - 9.5	1.4	pH, Metals, VOCs, TPH
Former Plating Line	HA-7B-2-2	8.5	1.5 - 2.0	4.4	pH, Metals, TOC
			3.0 - 3.5	4.6	---
			8.0 - 8.5	2.6	pH, Metals, TOC
Former Brite Dip Line	HA-7B-3-1	9.5	1.5 - 2.0	0.8	pH, Metals, VOCs, TOC
			6.5 - 7.0	1.3	---
			9.0 - 9.5	1.5	pH, Metals, VOCs, TOC

1 HA = Boring completed using a hand auger; SB = Boring completed using an auger rig.
2 TPH includes TPH/G, BTEX, TPH/D, and oil and grease analysis; metals are listed in Table 3.
3 Sample not analyzed.

0221CDJ4.TBL

TABLE 1

SUMMARY OF SOIL BORINGS AND ANALYSES COMPLETED
(continued)

Possible Source Area Addressed	Boring Designation[1]	Total Depth (feet)	Sample Depth (feet)	PID Readings (ppm)	Analyses Completed[2]
Building 7B					
Former Brite Dip Line	HA-7B-3-2	9.5	2.0 - 2.5	0.9	pH, Metals, VOCs, TOC
			7.0 - 7.5	70.0	---[3]
			9.0 - 9.5	75.0	pH, Metals, VOCs, TOC
Corporate Color Lab (Paint Dept.)	HA-7B-4-1	9.5	2.0 - 2.5	2.0	pH, Metals, VOCs
			7.0 - 7.5	2.0	---
			9.0 - 9.5	2.0	pH, Metals, VOCs
	HA-7B-4-2	8.5	2.5 - 3.0	2.5	pH, Metals, VOCs
			7.5 - 8.0	2.0	pH, Metals, VOCs
Above Ground Ink Sump	HA-7B-6-1	8.0	2.5 - 3.0	200.0	Metals, VOCs, TPH
			7.5 - 8.0	6.0	pH, Metals, VOCs, TPH
Former Machine Shop Area	HA-7B-7-1	9.5	2.0 - 2.5	200.0	pH, Metals, VOCs, TPH
			7.0 - 7.5	12.0	---
			9.0 - 9.5	7.0	pH, Metals, VOCs, TPH
	HA-7B-7-2	9.5	1.0 - 1.5	7.0	pH, Metals, VOCs, TPH
			6.0 - 6.5	2.2	---
			9.0 - 9.5	3.0	pH, Metals, VOCs, TPH
	HA-7B-7-3	8.0	1.5 - 2.0	325.0	pH, Metals, VOCs, TPH
			6.5 - 7.0	60.0	pH, Metals, VOCs, TPH
Machine/Milling Area	HA-7B-8-1	8.75	2.5 - 3.0	450.0	pH, Metals, VOCs, TPH
			7.5 - 8.0	200.0	pH, Metals, VOCs, TPH

1 HA = Boring completed using a hand auger; SB = Boring completed using an auger rig.
2 TPH includes TPH/G, BTEX, TPH/D, and oil and grease analysis; metals are listed in Table 3.
3 Sample not analyzed.

TABLE 1

SUMMARY OF SOIL BORINGS AND ANALYSES COMPLETED
(continued)

Possible Source Area Addressed	Boring Designation[1]	Total Depth (feet)	Sample Depth (feet)	PID Readings (ppm)	Analyses Completed[2]
Building 7C					
Metal Spray Room	HA-7C-1-1	9.5	2.5 - 3.0	1.8	pH, Metals, VOCs
			7.0 - 7.5	1.8	---[3]
			9.0 - 9.5	1.5	pH, Metals, VOCs
Former Aluminum Part Production	HA-7C-2-1	3.5	3.0 - 3.5	0.0	pH, Metals, VOCs
	HA-7C-2-2	9.5	4.0 - 4.5	1.6	pH, Metals, VOCs
			9.0 - 9.5	1.0	pH, Metals, VOCs
	HA-7C-2-3	9.5	3.5 - 4.0	0.0	pH, Metals, VOCs
			6.0 - 6.5	0.0	---
			9.0 - 9.5	0.0	pH, Metals, VOCs
	HA-7C-2-4	9.5	4.0 - 4.5	0.0	pH, Metals, VOCs
			6.0 - 6.5	0.0	---
			9.0 - 9.5	0.0	pH, Metals, VOCs
Area Between Buildings 7B & 7C/ Sanitary sewer	HA-7C-4-1	7.5	1.0 - 1.5	0.0	pH, Metals, VOCs
			6.0 - 6.5	0.0	pH, Metals, VOCs
	HA-7C-4-2	9.5	1.0 - 1.5	0.0	---
			6.0 - 6.5	0.8	pH, Metals, VOCs
			9.0 - 9.5	0.4	pH, Metals, VOCs

1 HA = Boring completed using a hand auger; SB = Boring completed using an auger rig.
2 TPH includes TPH/G, BTEX, TPH/D, and oil and grease analysis; metals are listed in Table 3.
3 Sample not analyzed.

TABLE 1

SUMMARY OF SOIL BORINGS AND ANALYSES COMPLETED
(continued)

Possible Source Area Addressed	Boring Designation[1]	Total Depth (feet)	Sample Depth (feet)	PID Readings (ppm)	Analyses Completed[2]
Building 7D					
Enclosed Storage Room (Former Paint Locker and hazardous materials storage)	HA-7D-1A-1	9.5	1.5 - 2.0	0.0	pH, Metals, VOCs, TPH
			6.5 - 7.0	2.0	pH, Metals, VOCs, TPH
			9.0 - 9.5	0.5	---[3]
	HA-7D-1A-2	7.5	1.5 - 2.0	9.0	pH, Metals, VOCs, TPH
			6.5 - 7.0	4.0	pH, Metals, VOCs, TPH
	HA-7D-1A-3	9.5	1.0 - 1.5	6.0	pH, Metals, VOCs, TPH
			6.0 - 6.5	2.0	---
			9.0 - 9.5	2.8	pH, Metals, VOCs, TPH
	HA-7D-1A-4	8.5	1.0 - 1.5	428.0	pH, Metals, VOCs, TPH
			6.0 - 6.5	170.0	---
			8.0 - 8.5	51.0	pH, Metals, VOCs, TPH
Covered Storage Area	HA-7D-1B-1	9.5	1.0 - 1.5	0.9	pH, Metals, VOCs
			6.0 - 6.5	0.3	---
			9.0 - 9.5	0.0	pH, Metals, VOCs
	HA-7D-1B-2	9.5	1.0 - 1.5	1.0	pH, Metals, VOCs
			6.0 - 6.5	0.3	---
			9.0 - 9.5	0.3	pH, Metals, VOCS
Former Concrete Clarifier Tank	HA-7D-2-1	9.5	1.0 - 1.5	7.0	pH, Metals, VOCs
			6.0 - 6.5	7.6	---
			9.0 - 9.5	6.2	pH, Metals, VOCs

1 HA = Boring completed using a hand auger; SB = Boring completed using an auger rig.
2 TPH includes TPH/G, BTEX, TPH/D, and oil and grease analysis; metals are listed in Table 3.
3 Sample not analyzed.

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TABLE 1

SUMMARY OF SOIL BORINGS AND ANALYSES COMPLETED
(continued)

Possible Source Area Addressed	Boring Designation[1]	Total Depth (feet)	Sample Depth (feet)	PID Readings (ppm)	Analyses Completed[2]
Building 7D					
Fork Lift Repair Area (Original Foundry)	HA-7D-3-1	9.0	1.0 - 1.5	0.0	pH, Metals, VOCs, TPH
			6.0 - 6.5	0.3	---[3]
			8.5 - 9.0	0.0	pH, Metals, VOCs, TPH
Storage Room (Original Foundry)	HA-7D-3-2	9.5	1.5 - 2.0	0.0	pH, Metals, VOCs, TPH
			6.5 - 7.0	0.1	---
			9.0 - 9.5	0.1	pH, Metals, VOCs, TPH
	HA-7D-3-4	9.5	1.0 - 1.5	0.0	pH, Metals, VOCs, TPH
			6.0 - 6.5	0.0	---
			9.0 - 9.5	0.0	pH, Metals, VOCs, TPH
Building 7E (Former Location Die cast operations and foundry)	SB-7E-2	21.5	2.0 - 2.5	78.0	pH, Metals, TPH
			6.0 - 6.5	70.0	TPH
			11.0 - 11.5	2.1	pH, TPH, Metals
			16.0 - 16.5	1.0	TPH
			20.5 - 21.0[4]	1.2	pH, Metals
	SB-7E-3	26.5	2.0 - 2.5	2.8	pH, Metals
			6.0 - 6.5	1.3	---
			11.0 - 11.5	0.9	---
			16.0 - 16.5	0.9	pH, Metals
			21.0 - 21.5	1.2	---
			26.0 - 26.5[4]	1.6	pH, Metals
	SB-7E-4	25.0	3.5 - 4.0	35.0	pH, Metals
			6.0 - 6.5	30.0	VOCs
			11.0 - 11.5	2.5	pH, Metals, VOCs
			16.0 - 16.5	5.0	VOCs
			21.0 - 21.5[4]	4.0	pH, Metals

1 HA = Boring completed using a hand auger; SB = Boring completed using an auger rig.
2 TPH includes TPH/G, BTEX, TPH/D, and oil and grease analysis; metals are listed in Table 3
3 Sample not analyzed.

TABLE 1

SUMMARY OF SOIL BORINGS AND ANALYSES COMPLETED
(continued)

Possible Source Area Addressed	Boring Designation[1]	Total Depth (feet)	Sample Depth (feet)	PID Readings (ppm)	Analyses Completed[2]
Building 7E (Former Location)	SB-7E-5	25.0	2.0 - 2.5	---[3]	pH, Metals
			6.0 - 6.5	1.8	VOCs
			11.0 - 11.5	1.6	pH, Metals, VOCs
			16.0 - 16.5	3.5	VOCs
			21.0 - 21.5	3.0	pH, Metals, VOCs
	SB-7E-6	23.5	2.5 - 3.0	23.0	pH, Metals, VOCs, TPH
			6.0 - 6.5	21.0	VOCs, TPH
			11.0 - 11.5	5.5	pH, Metals, VOCs, TPH
			16.0 - 16.5	7.0	VOCs, TPH
			21.0 - 21.5	3.5	---
			22.0 - 22.5[4]	3.5	pH, Metals, VOCs, TPH
Building 7F (Former Location)	SB-7F-1	21.5	2.0 - 2.5	45.0	pH, Metals
			6.0 - 6.5	0.8	TPH
			11.0 - 11.5	0.8	pH, Metals, TPH
			16.0 - 16.5	0.7	TPH
			21.0 - 21.5[4]	1.0	pH, Metals
	SB-7F-2	21.5	2.0 - 2.5	9.8	pH, Metals
			6.0 - 6.5	0.8	VOCs
			11.0 - 11.5	0.8	pH, Metals, VOCs
			16.0 - 16.5	0.9	VOCs
			21.0 - 21.5[4]	1.4	pH, Metals

1 HA = Boring completed using a hand auger; SB = Boring completed using an auger rig.
2 TPH includes TPH/G, BTEX, TPH/D, and oil and grease analysis; metals are listed in Table 3.
3 Sample not analyzed.
4 Saturated soil sample.

0221CDJ4

TABLE 1

SUMMARY OF SOIL BORINGS AND ANALYSES COMPLETED
(continued)

Possible Source Area Addressed	Boring Designation[1]	Total Depth (feet)	Sample Depth (feet)	PID Readings (ppm)	Analyses Completed[2]
Building 7F (Former Location)	SB-7F-3	22.0	3.0 - 3.5	1.5	pH, Metals
			6.0 - 6.5	1.5	TPH
			11.0 - 11.5	1.0	pH, Metals, TPH
			16.0 - 16.5	1.0	TPH
			21.0 - 21.5[4]	1.0	pH, Metals
	SB-7F-4	21.5	2.0 - 2.5	0.8	pH, Metals
			6.0 - 6.5	0.7	VOCs
			11.0 - 11.5	7.2	pH, Metals, VOCs
			16.0 - 16.5	1.1	VOCs
			20.5 - 21.0[4]	1.6	pH, Metals
	SB-7F-5	21.5	2.0 - 2.5	0.6	pH, Metals
			6.0 - 6.5	0.7	TPH
			11.0 - 11.5	1.0	pH, Metals, TPH
			16.0 - 16.5	1.0	TPH
			20.5 - 21.0[4]	1.2	pH, Metals
	SB-7F-6	22.0	1.5 - 2.0	0.8	pH, Metals
			6.0 - 6.5	0.8	TPH
			11.0 - 11.5	0.8	pH, Metals, TPH
			16.0 - 16.5	0.6	TPH
			21.0 - 21.5[4]	1.0	pH, Metals

1 HA = Boring completed using a hand auger; SB = Boring completed using an auger rig.
2 TPH includes TPH/G, BTEX, TPH/D, and oil and grease analysis; metals are listed in Table 3.
3 Sample not analyzed.
4 Saturated soil sample.

0221CDJ4

TABLE 1

SUMMARY OF SOIL BORINGS AND ANALYSES COMPLETED
(continued)

Possible Source Area Addressed	Boring Designation[1]	Total Depth (feet)	Sample Depth (feet)	PID Readings (ppm)	Analyses Completed[2]
Building 7F (Former Location)	SB-7F-7	22.0	2.0 - 2.5	1.4	---[3]
			6.0 - 6.5	1.8	VOCs, TPH
			11.0 - 11.5	1.4	VOCs, TPH
			16.0 - 16.5	1.8	VOCs, TPH
			21.0 - 21.5[4]	2.0	VOCs, TPH
	SB-7F-8	22.0	2.0 - 2.5	21.0	pH, Metals, VOCs, TPH
			6.0 - 6.5	10.0	VOCs, TPH
			11.0 - 11.5	9.0	pH, Metals, VOCs, TPH
			16.0 - 16.5	5.0	VOCs, TPH
			21.0 - 21.5[4]	2.5	pH, Metals, VOCs, TPH
Building 7G (Former Location)	SB-7G-1	22.0	2.5 - 3.0	1.0	pH, Metals
			6.0 - 6.5	1.0	---
			11.0 - 11.5	1.0	pH, Metals
			16.0 - 16.5	1.0	---
			21.0 - 21.5[4]	2.0	pH, Metals
	SB-7G-2	22.0	3.0 - 3.5	2.0	pH, Metals
			6.0 - 6.5	2.5	VOCs
			11.0 - 11.5	2.0	pH, Metals, VOCs
			16.0 - 16.5	2.0	VOCs
			21.0 - 21.5[4]	1.6	pH, Metals

1 HA = Boring completed using a hand auger; SB = Boring completed using an auger rig.
2 TPH includes TPH/G, BTEX, TPH/D, and oil and grease analysis; metals are listed in Table 3.
3 Sample not analyzed.
4 Saturated soil sample.

0221CDJ4

TABLE 1

SUMMARY OF SOIL BORINGS AND ANALYSES COMPLETED
(continued)

Possible Source Area Addressed	Boring Designation[1]	Total Depth (feet)	Sample Depth (feet)	PID Readings (ppm)	Analyses Completed[2]
Building 7G (Former Location)	SB-7G-3	22.0	2.0 - 2.5	7.0	pH, Metals
			6.0 - 6.5	5.0	VOCs
			11.0 - 11.5	1.0	VOCs
			16.0 - 16.5	0.8	pH, Metals, VOCs
			21.0 - 21.5[4]	0.8	pH, Metals, VOCs
	SB-7G-4	22.0	2.0 - 1.5	3.5	pH, Metals
			6.0 - 6.5	4.0	VOCs
			11.0 - 11.5	2.5	pH, Metals, VOCs
			16.0 - 16.5	3.5	VOCs
			21.0 - 21.5[4]	1.0	pH, Metals
	SB-7G-5	22.0	2.5 - 3.0	12.0	---[3]
			6.0 - 6.5	11.0	VOCs, TPH
			11.0 - 11.5	6.0	VOCs, TPH
			16.0 - 16.5	5.0	VOCs, TPH
			21.0 - 21.5[4]	3.8	TPH
	SB-7G-6	22.0	1.5 - 2.0	7.0	pH, Metals
			6.0 - 6.5	7.0	TPH
			11.0 - 11.5	1.5	pH, Metals, TPH
			16.0 - 16.5	2.5	pH, Metals, TPH
	SB-7G-7	22.0	2.5 - 3.0	1.0	pH, Metals
			6.0 - 6.5	1.2	VOCs
			11.0 - 11.5	0.6	pH, Metals, VOCs
			16.0 - 16.5	0.6	VOCs
			21.0 - 21.5[4]	0.8	pH, Metals, VOCs

1 HA = Boring completed using a hand auger; SB = Boring completed using an auger rig.
2 TPH includes TPH/G, BTEX, TPH/D, and oil and grease analysis; metals are listed in Table 3.
3 Sample not analyzed.
4 Saturated soil sample.

TABLE 1

SUMMARY OF SOIL BORINGS AND ANALYSES COMPLETED
(continued)

Possible Source Area Addressed	Boring Designation[1]	Total Depth (feet)	Sample Depth (feet)	PID Readings (ppm)	Analyses Completed[2]
Building 7G (Former Location)	SB-7G-8	22.0	2.0 - 2.5	1.0	---[3]
			6.0 - 6.5	1.0	VOCs, TPH
			11.0 - 11.5	0.6	VOCs, TPH
			16.0 - 16.5	0.8	VOCs, TPH
			21.0 - 21.5[4]	1.5	VOCs, TPH
Building 12					
Brite Dip Line	HA-12U-3-1	9.5	4.0 - 4.5	1.8	pH, Metals, VOCs
			9.0 - 9.5	1.6	pH, Metals, VOCs
Former PCE Degreaser	HA-12U-9-1	10.0	4.5 - 5.0	65.0	pH, Metals, VOCs
			9.5 - 10.0	160.0	pH, Metals, VOCs
Building 12 Exterior	SB-12-1	25.0	2.0 - 2.5	2.0	pH, Metals
			6.0 - 6.5	2.0	VOCs
			11.0 - 11.5	140.0	pH, Metals, VOCs
			16.0 - 16.5	100.0	---
			21.0 - 21.5	45.0	VOCs
			24.0 - 24.5[4]	13.0	VOCs

1 HA = Boring completed using a hand auger; SB = Boring completed using an auger rig.
2 TPH includes TPH/G, BTEX, TPH/D, and oil and grease analysis; metals are listed in Table 3.
3 Sample not analyzed.
4 Saturated soil sample.

0221CDJ4

TABLE 1

SUMMARY OF SOIL BORINGS AND ANALYSES COMPLETED
(continued)

Possible Source Area Addressed	Boring Designation[1]	Total Depth (feet)	Sample Depth (feet)	PID Readings (ppm)	Analyses Completed[2]
Building 12 Exterior	SB-12-2	26.5	2.0 - 2.5	2.0	pH, Metals
			6.0 - 6.5	7.0	VOCs
			11.0 - 11.5	50.0	---[3]
			16.0 - 16.5	110.0	pH, Metals, VOCs
			21.0 - 21.5	10.0	---
			25.5 - 26.0[4]	2.5	pH, Metals, VOCs
	SB-12-3	26.5	2.5 - 3.0	1.0	pH, Metals
			6.0 - 6.5	1.0	VOCs
			11.0 - 11.5	3.0	pH, Metals, VOCs
			16.0 - 16.5	2.2	---
			21.0 - 21.5	2.5	VOCs
			26.0 - 26.5[4]	1.5	pH, Metals, VOCs
	SB-12-4	25.0	3.0 - 3.5	1.6	pH, Metals
			6.0 - 6.5	1.5	VOCs
			11.0 - 11.5	1.8	pH, Metals, VOCs
			16.0 - 16.5	1.2	---
			21.0 - 21.5	1.6	VOCs
			24.0 - 24.5	1.4	pH, Metals, VOCs
	SB-12-5	25.0	1.5 - 2.0	1.6	pH, Metals
			6.0 - 6.5	1.2	TPH
			11.0 - 11.5	1.4	pH, Metals, VOCs, TPH
			16.0 - 16.5	3.0	---
			21.0 - 21.5	2.0	pH, Metals, VOCs, TPH
			24.0 - 24.5[4]	1.5	pH, Metals, TPH

1 HA = Boring completed using a hand auger; SB = Boring completed using an auger rig.
2 TPH includes TPH/G, BTEX, TPH/D, and oil and grease analysis; metals are listed in Table 3
3 Sample not analyzed.
4 Saturated soil sample.

0221CDJ4

TABLE 1

SUMMARY OF SOIL BORINGS AND ANALYSES COMPLETED
(continued)

Possible Source Area Addressed	Boring Designation[1]	Total Depth (feet)	Sample Depth (feet)	PID Readings (ppm)	Analyses Completed[2]
Building 12 Exterior	SB-12-6	25.0	2.5 - 3.0	1.2	pH, Metals
			6.0 - 6.5	1.0	---[3]
			11.0 - 11.5	2.6	pH, Metals, VOCs
			16.0 - 16.5	2.0	---
			21.0 - 21.5	2.8	pH, Metals, VOCs
			24.0 - 24.5[4]	1.0	pH, Metals, VOCs
Chemical Storage Building	SB-CS-1	22.0	2.5 - 3.0	0.8	pH, Metals
			6.0 - 6.5	0.6	VOCs
			11.0 - 11.5	0.4	pH, Metals, VOCs
			16.0 - 16.5	2.0	VOCs
			21.0 - 21.5[4]	1.0	pH, Metals
	SB-CS-2	21.21	5.66 - 6.01	3.4	---
			7.78 - 8.13	5.0	pH, Metals
			10.97 - 11.31	3.0	---
			14.50 - 14.85	4.4	pH, Metals, VOCs
			18.38 - 18.74	3.0	pH, Metals, VOCs
			20.51 - 20.86[4]	2.8	pH, Metals, VOCs

1 HA = Boring completed using a hand auger; SB = Boring completed using an auger rig.
2 TPH includes TPH/G, BTEX, TPH/D, and oil and grease analysis; metals are listed in Table 3.
3 Sample not analyzed.
4 Saturated soil sample.

0221CDJ4

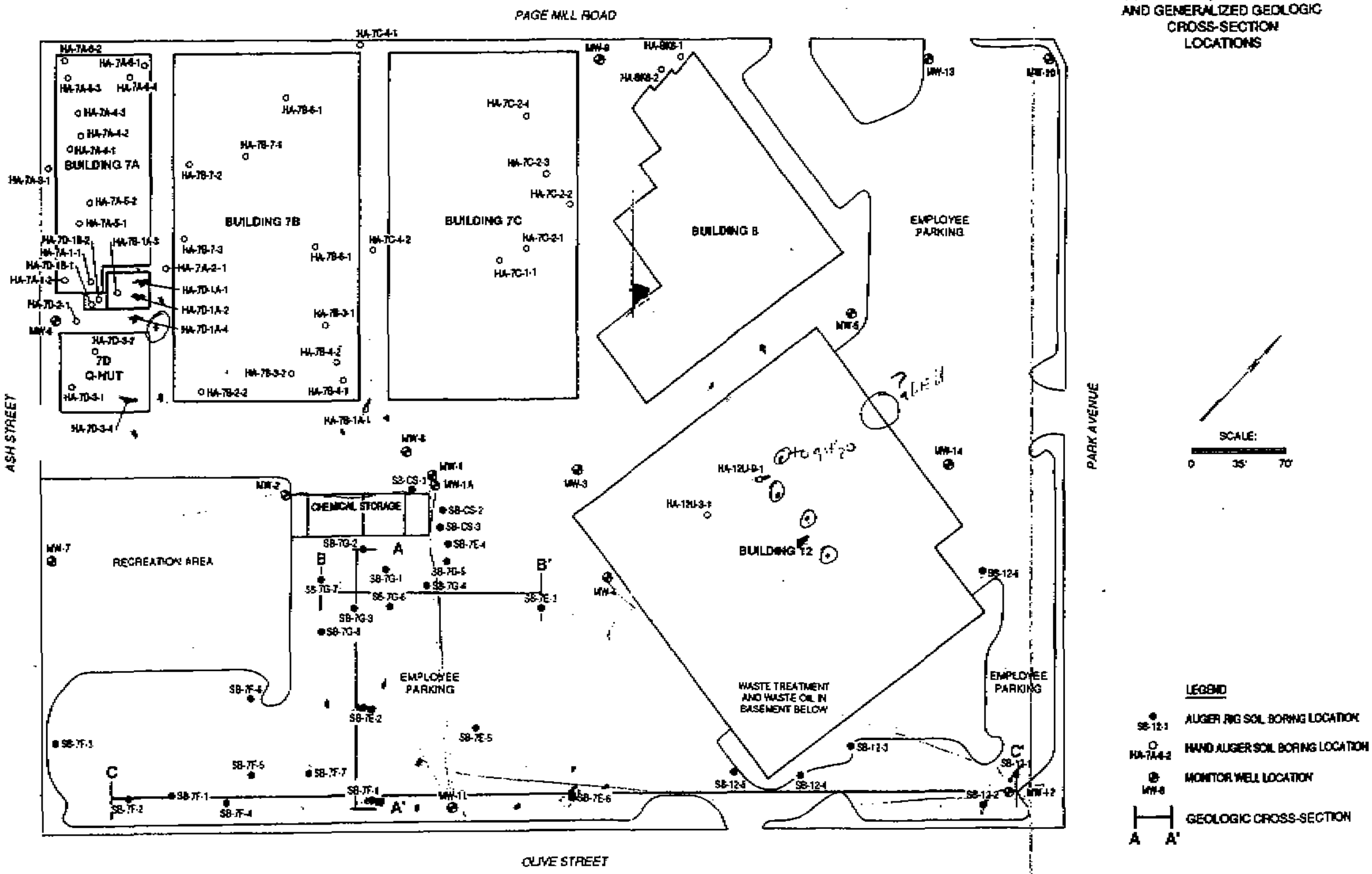
TABLE 1

SUMMARY OF SOIL BORINGS AND ANALYSES COMPLETED
(continued)

Possible Source Area Addressed	Boring Designation[1]	Total Depth (feet)	Sample Depth (feet)	PID Readings (ppm)	Analyses Completed[2]
Chemical Storage Building	SB-CS-3	19.10	4.24 - 4.60	3.1	---[3]
			7.78 - 8.13	3.8	pH, Metals, VOCs
			11.30 - 11.67	3.0	---
			14.85 - 15.20	1.6	pH, Metals, VOCs
			18.38 - 18.74	---	pH, Metals, VOCs
Background (Adjacent to Building 8)	HA-BKG-1	9.5	1.5 - 2.0	1.4	pH, Metals
			6.5 - 7.0	1.0	---
			9.0 - 9.5	0.0	pH, Metals
	HA-BKG-2	9.5	1.5 - 2.0	1.0	pH, Metals
			6.5 - 7.0	0.8	---
			9.0 - 9.5	0.4	pH, Metals

1 HA = Boring completed using a hand auger; SB = Boring completed using an auger rig.
2 TPH includes TPH/G, BTEX, TPH/D and oil and grease analysis; metals are listed in Table 3.
3 Sample not analyzed.

FIGURE 2
SOIL BORING, MONITOR WELL, AND GENERALIZED GEOLOGIC CROSS-SECTION LOCATIONS



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Drill cuttings and fluids were stored on-site pending disposition based on analytical results.

During all soil drilling activities the working air space was monitored using a photoionization device (PID) to detect the presence of volatile organic compounds (VOCs). In addition, headspace values were obtained from soil samples placed in sealed plastic bags to monitor VOC concentrations in soil.

Upon completion of each auger rig soil boring, grab water samples were collected.- A disposable teflon bailer was lowered into the borehole and allowed to fill. The bailer was removed, a disposable teflon sample port was attached and glass VOA vials were filled and capped without trapping air. Grab water sample collection was not possible in all borings due to the very low permeability of the water-bearing materials encountered at certain locations.

All soil borings were backgrouted following sampling with neat cement and 5% bentonite powder or granular bentonite mixture. The borings were capped with asphalt or concrete as appropriate.

Soil samples from each soil boring were selected for chemical analysis based on PID equipment readings and field observations such as chemical odors or textural variations. Analyses to be performed were based on the chemical use history. At boring locations where the chemicals of concern included metals, the sample collected immediately below the pavement/floor surface or underlying fill material was submitted for analysis. In the auger rig borings, metals analysis was performed on approximately every other soil sample collected from the boring, so that one sample from each ten foot interval was analyzed. pH analyses were also performed on all samples which were analyzed for metals. Analyses for volatile organic compounds (VOCs) and total petroleum hydrocarbons (TPH) were generally performed on all samples collected from the boring excluding the most shallow soil sample. For the hand auger borings, the sample collected immediately beneath the fill material and the deepest soil samples collected were submitted for laboratory analyses.

Soil samples selected for analysis were sent under chain-of-custody via an overnight delivery service, or laboratory pick-up, to Chemwest Analytical Laboratories, Inc., a State Certified Laboratory. Analytical methods included EPA Method 8240 for volatile organic compounds, EPA Method 9045 for pH, EPA Method 8080 for polychlorinated biphenyls (PCBs) and pesticides, EPA Method 9060 for total organic carbon (TOC), and EPA Method 7000 series for metals analyses. Metals analyses included: Aluminum, Arsenic, Antimony, Barium, Beryllium, Cadmium, Chromium (total), Chromium-VI, Cobalt, Copper, Cyanide, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, and Zinc. These metals, excluding Aluminum and Cyanide, are referred to by Chemwest Analytical Laboratory as C.A.M. metals (California Assessment Manual) in the analytical data sheets. Aluminum and Cyanide analytical results are reported on separate data sheets.

Analysis of TPH compounds included TPH-Gasoline (TPH/G) and TPH-Diesel (TPH/D) by Department of Health Services (DHS) Leaking Underground Fuel Tank (LUFT) Methods, and oil and grease analyses by EPA Method 413.2. The TPH analyses also included volatile aromatic compounds, EPA Method 8020 in accordance with the DHS-LUFT Method (benzene, toluene, ethylbenzene and xylenes [BTEX]). In cases where the TPH sample were also being analyzed for VOCs by EPA Method 8240, duplicate analysis for BTEX by Method 8020 was not performed.

All soil sampling, equipment decontamination, chain-of-custody preparation, and quality assurance/quality control (QA/QC) procedures were performed in accordance with the McLaren "Quality Assurance Project Plan (QAPP) for Hewlett-Packard Company, 395 Page Mill Road," dated April 15, 1987. All laboratory analytical procedures were performed in accordance with the CHEMWEST Analytical Laboratory "Quality Assurance Program," dated April 8, 1987.

SOIL GAS SURVEY LOCATIONS AND RATIONALE

A soil gas survey was conducted as a screening tool to identify whether volatile organic compounds were present in shallow soils at the site and to aid in determination of soil boring locations. Soil gas survey locations were placed on an approximate 100 foot grid over the entire outdoor area of the site. Locations where data points (i.e. monitoring wells) already existed or where underground utilities were present were not sampled. Additional survey locations were placed in the area of former Buildings 7E, 7F, and 7G area, where complete chemical use information was not available and historical activity less well documented. The soil gas survey was particularly useful in determining additional soil boring locations in the vicinity of W-12. Soil gas data was obtained at 73 sample locations at depths of 3 to 13 feet below grade. Soil vapor data on the following compounds was obtained:

- 1,1, dichloroethene (1,1,DCE)
- 1,1, dichloroethane (1,1,DCA)
- 1,2, dichloroethane (1,2,DCA)
- trichloroethane (TCA)
- trichloroethene (TCE)
- tetrachloroethene (PCE)
- trichlorotrifluoroethane (F-113)
- benzene
- toluene
- ethylbenzene
- xylenes
- total hydrocarbons

During the investigation F-113 was detected in soil gas samples and was added to the list of compounds analyzed. Soil gas survey locations are shown on Figure 4. The soil gas survey report is included as Appendix B.

SOIL SAMPLING LOCATIONS AND RATIONALE

Soil sampling locations and sampling rationale for each area investigated are discussed below by building number. All chemical use areas identified in the "Chemical Use History Hewlett-Packard Facility Palo Alto Fabrication Center, 395 Page Mill Road, Palo Alto, California" dated June 1, 1989 are shown on Figure 3.

Building 7A

Thirteen hand auger borings were drilled inside and adjacent to Building 7A to address potential source areas of chemicals to soil and groundwater. The locations of the soil borings and the chemical use areas investigated in the vicinity of Building 7A are shown in Figure 5.

Two soil borings were drilled in the Model Shop, located in the southeast portion of the building, to address the paint booth, sinks, floor drains, and solvent storage area. Boring HA-7A-1-1 was drilled 10 feet southwest of the door to a total depth of 9.5 feet below grade. Soil samples collected from depths of 0.5 feet and 9.0 feet below grade were submitted for laboratory analysis for pH, metals, and volatile organic compounds (VOCs). Soil boring HA-7A-1-2 was drilled adjacent to the paint booth to a total depth of 7.5 feet below grade. The hand auger was denied at this depth due to gravel. Soil samples collected from depths of 1.0 and 6.0 feet below grade were submitted for laboratory analysis of pH, metals, and VOCs.

One hand auger boring was drilled adjacent to the transformers located outside the northeast corner of Building 7A. Soil boring HA-7A-2-1 was drilled adjacent to the transformer identified as contaminated with PCBs. The boring was drilled to a total depth of 9.5 feet below grade. Soil samples were collected at depths of 6.5 and 9.0 feet and were submitted for laboratory analysis for pH, PCBs. Pesticide analyses were included as part of the PCB (EPA Method 8080) analysis.

One hand auger boring was drilled adjacent to the former location of the 1,000 gallon holding tank located on the Ash Street side of Building 7A. The holding tank is reported to have received wastes from the former chemical milling operation. The tank was removed in 1981, however, no soil samples are reported to have been collected at that time. Boring HA-7A-3-1 was drilled to a total depth of 7.5 feet below grade, where the hand auger was denied due to gravel. Soil samples were collected from depths of 1.0 and 6.0 feet below grade and were submitted for laboratory analysis for pH, metals, and VOCs.

Three soil borings were drilled in the former chemical milling operations area reportedly located in the central portion of Building 7A. The chemical milling operation consisted of a metal etching process which used acid and caustic solutions. Soil borings HA-7A-4-1, HA-7A-4-2, and HA-7A-4-3 were drilled to total depths of 8.0, 7.5, and 8.0 feet below grade, respectively, at which depth each boring was denied due to gravel. Soil samples collected from depths of 2.0 and 7.0 feet from Boring HA-7A-4-1,

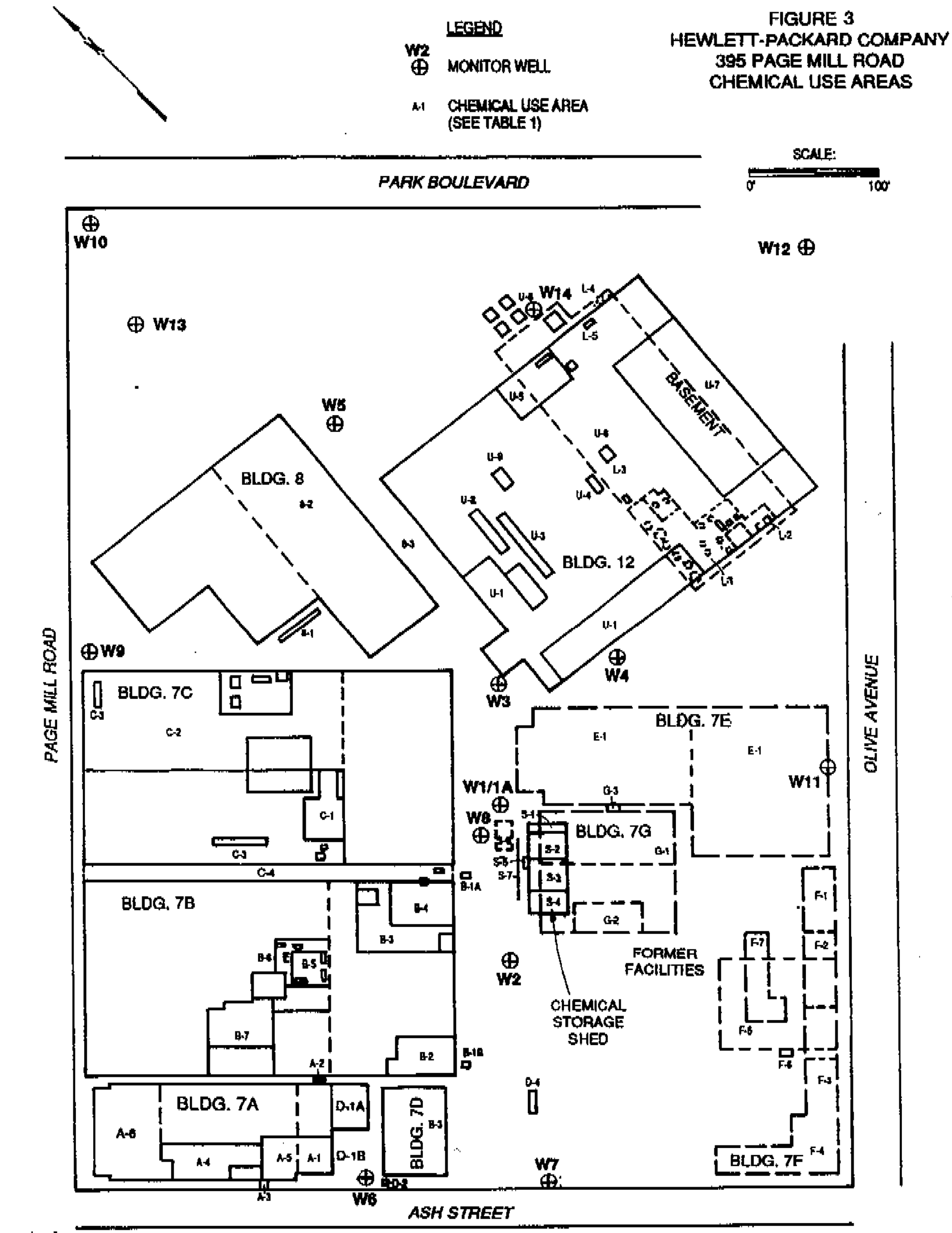

FIGURE 3
HEWLETT-PACKARD COMPANY
395 PAGE MILL ROAD
CHEMICAL USE AREAS

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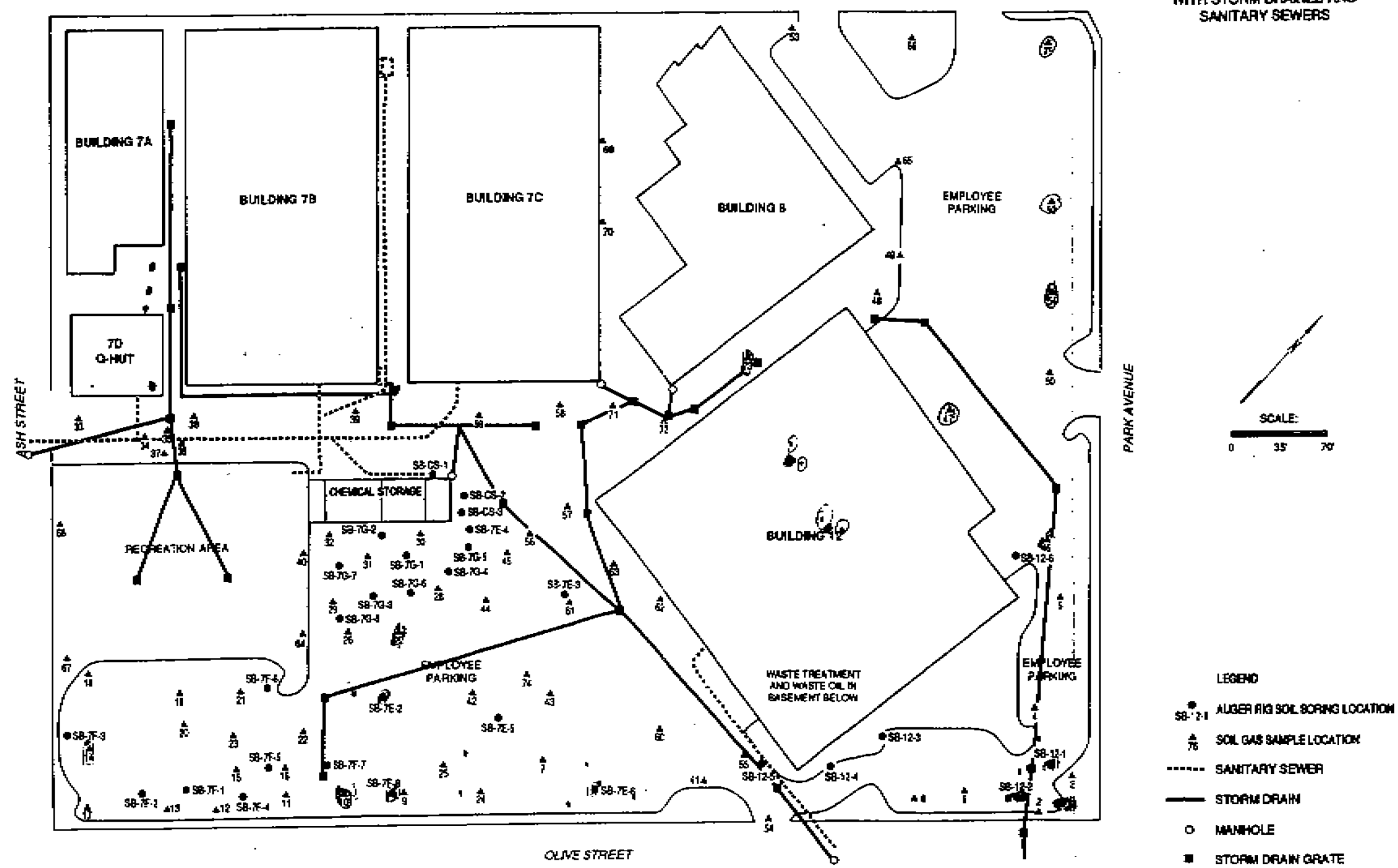
FIGURE 4
AUGER RIG SOIL BORING AND
SOIL GAS SAMPLE LOCATIONS
WITH STORM DRAINES AND
SANITARY SEWERS



Soil gas total VOCs 1ppb or greater

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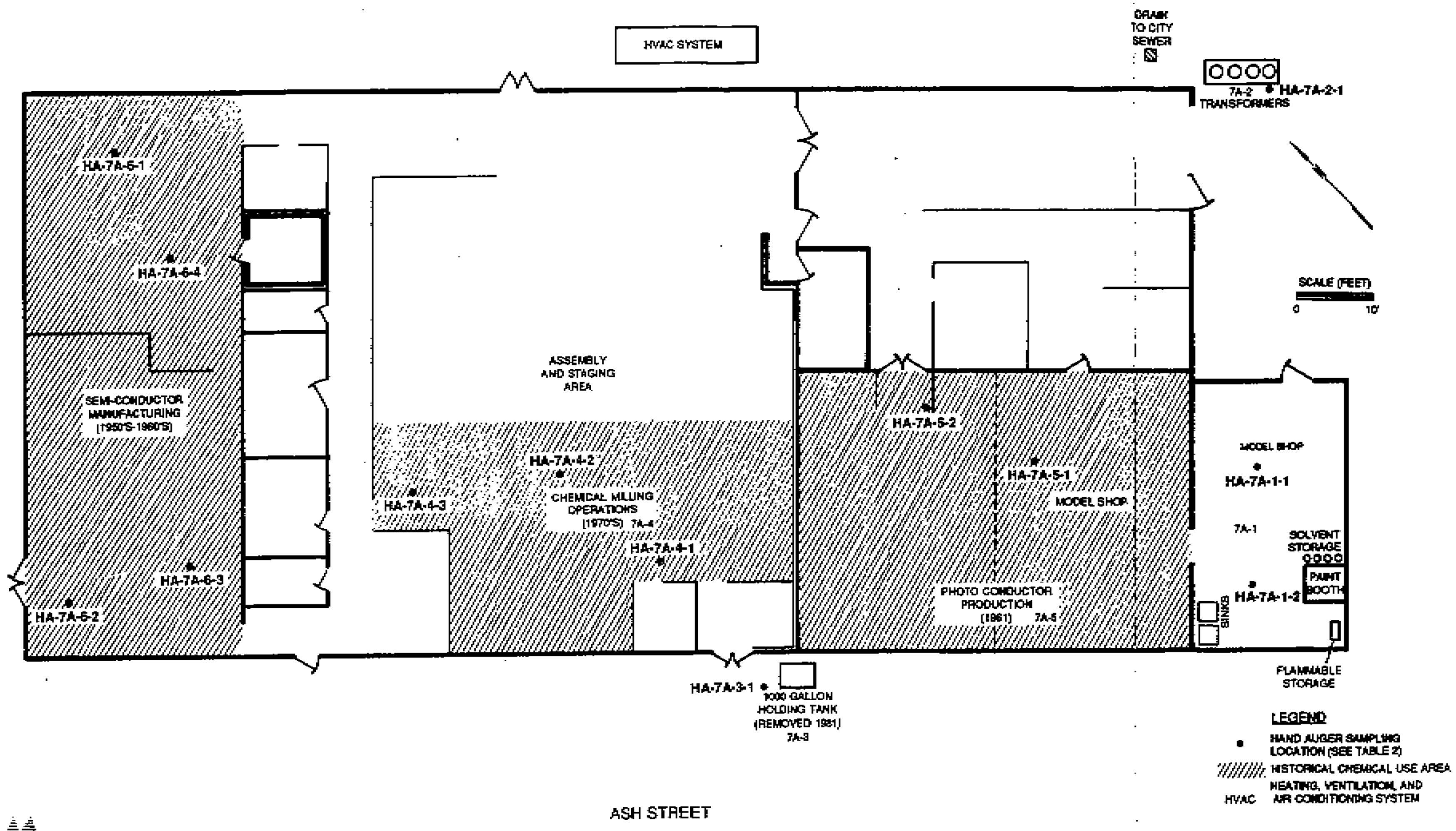
FIGURE 5
HEWLETT-PACKARD COMPANY
395 PAGE MILL ROAD
FLOOR PLAN-1988
BUILDING 7A



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from a depth of 2.0 feet from Boring HA-7A-4-2, and from depths of 1.5 and 6.5 feet from Boring HA-7A-4-3 were all submitted for pH and metals analysis.

Two soil borings were drilled to address the former photo conductor production area located in the southeastern portion of the building. The chemical use associated with the photo conductor processes includes primarily acid, caustic and plating solutions. Soil boring HA-7A-5-1 was drilled in the current model shop area to a total depth of 9.5 feet below grade. Boring HA-7A-5-2 was drilled in the adjacent office area to a total depth of 9.0 feet below grade. Soil samples collected from depths of 1.5 and 9.0 feet from boring HA-7A-5-1, and collected from depths of 1.5 and 8.5 feet from boring HA-7A-5-2, were submitted for laboratory analysis for pH, metals, and VOCs.

Four soil borings were drilled in the northwest portion of Building 7A to address the former semi-conductor manufacturing area. The chemical use in this area included solvent, acid, caustic, and plating solutions. Soil samples submitted for laboratory analysis from this area were analyzed for pH, metals, and VOCs. Borings HA-7A-6-1 and HA-7A-6-4 were drilled near the northern corner of the building to total depths of 7.5 feet below grade where the hand auger was denied by gravel in both borings. Soil samples collected from both borings at depths of 1.5 and 6.5 feet below grade were submitted for laboratory analysis. Boring HA-7A-6-2 was drilled near the western corner of the building to a total depth of 9.5 feet below grade. Soil samples collected from depths of 2.0 and 9.0 were submitted for laboratory analysis. Boring HA-7A-6-3 was drilled approximately 15 feet west of boring HA-7A-6-2 to a total depth of 9.5 feet below grade. Elevated concentrations of organic vapors were detected with the photoionization device (PID) during augering of Boring HA-7A-6-3 but no odors were observed. Samples were collected from depths of 1.0, 6.0, and 9.0 feet with PID values of 260, 440, and 28 parts per million (ppm), respectively. The samples collected from depths of 1.0 and 9.0 feet were submitted for laboratory analyses for pH, metals, and VOCs.

Building 7B

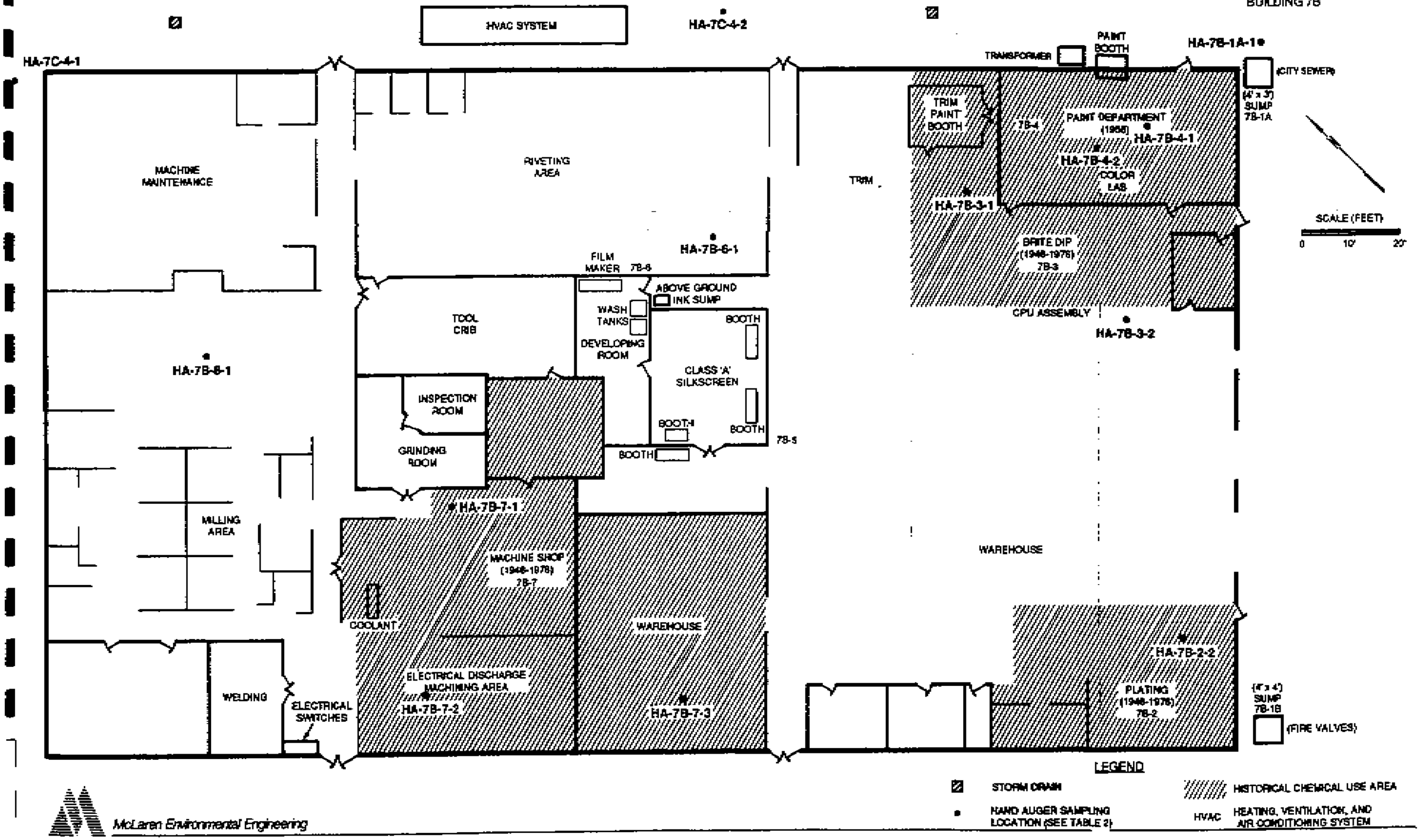
Eleven hand auger borings were drilled inside and adjacent to Building 7B to address potential source areas identified in the chemical use history. The locations of the soil borings and the chemical use areas are shown in Figure 6.

One hand auger boring was drilled adjacent to the sump located at the northeast exterior corner of Building 7B. The inside of the sump is 2.5 feet deep and reportedly collects rainwater from Buildings 7B and 7C and sewage from Building 7C and discharges to the sanitary sewer. Boring HA-7B-1A-1 was drilled adjacent to the sump to a total depth of 9.5 feet below grade. Soil samples collected from depths of 1.5 and 9.0 feet were submitted for laboratory analysis for pH, metals, VOCs, and TPH.

One inch copper piping is inlaid into the concrete floor inside Building 7B. These pipes were installed as part of an experimental heating system

C - 4

FIGURE 6
HEWLETT-PACKARD COMPANY
395 PAGE MILL ROAD
FLOOR PLAN-1988
BUILDING 7B



design which would utilize water circulated through the piping to heat the building. No chemicals were ever conveyed through these pipes and this system was never utilized.

Two soil borings were proposed to address the plating line formerly located in the interior southwest corner of Building 7B. Acids, bases and metals are associated with operations in the former plating line area. Soil boring HA-7B-2-1 was attempted but denied by the heating pipeline and no soil samples were collected. Soil boring HA-7B-2-2 was drilled to a total depth of 8.5 feet. Soil samples collected from depths of 1.5 and 8.0 feet were submitted for laboratory analyses for pH, metals and total organic carbon (TOC).

Two soil borings were drilled in the northeast portion of the building near what is currently the Corporate Color Lab, to address the brite dip plating line formerly located in this area. Solvents, acids, bases, and metals are reported to have been used in the brite dip process. Soil borings HA-7B-3-1 and HA-7B-3-2 were drilled to total depths of 9.5 feet below grade. Elevated PID readings were detected from samples collected during the augering of Boring HA-7B-3-2. The sample collected from a depth of 2.0 feet below grade had a PID reading of 0.9 ppm. The 7.0-foot sample and 9.0-foot sample had PID readings of 70 ppm and 75 ppm, respectively. No odors were detected during drilling of the borehole. Soil samples collected from depths of 1.5 and 9.0 feet from boring HA-7B-3-1, and from depths of 2.0 and 9.0 feet from boring HA-7B-3-2, were submitted for laboratory analysis for pH, metals, VOCs, and TOC.

Two soil borings were drilled in the Corporate Color Lab located in the northwest corner of the building. Soil boring HA-7B-4-1 was drilled adjacent to the paint booth to a total depth of 9.5 feet below grade. Soil samples collected from depths of 2.0 and 9.0 feet were submitted for laboratory analysis. Boring HA-7B-4-2 was drilled in the paint storage area to a total depth of 8.5 feet below grade, where the hand auger was denied by piping. Soil samples were collected from depths of 2.5 and 7.5 feet below grade and submitted for laboratory analysis. Samples from both borings were analyzed for pH, metals, and VOCs.

Soil boring HA-7B-6-1 was drilled in the central portion of Building 7B in the vicinity of the above ground silkscreen ink sump. The boring was drilled to a total depth of 8.0 feet below grade, at which depth the hand auger was denied. Soil samples were collected from depths of 2.5 and 7.5 feet, with corresponding PID readings of 200 ppm and 6.0 ppm, respectively. The samples were submitted for laboratory analysis for pH, metals, and VOCs.

Three borings were drilled in the south central portion of the building to address the former machine shop area. Elevated PID readings were detected in two of the three borings. Borings HA-7B-7-1 and HA-7B-7-2 were drilled in the current machine shop area to total depths of 9.5 feet below grade. Soil samples were collected from depths of 2.0, 7.0, and 9.0 feet below grade from Boring HA-7B-7-1, with corresponding PID readings of 200 ppm, 12 ppm and 7.0 ppm, respectively. The 2.0-foot and 9.0-foot samples were submitted for analysis for pH, metals, VOCs, and TPH. Soil samples collected from depths of 1.0 and 9.0 feet below grade from boring HA-7B-7-2 were submitted for laboratory analyses for pH, metals, VOCs, and TPH. Boring HA-7B-7-3 was drilled in the current warehouse area to investigate the former machine area. Boring HA-7B-7-3 was drilled to a total depth of 8.0 feet below grade, where the hand auger was denied due to piping. Soil samples were collected from depths of 1.5 and 6.5 feet with corresponding PID readings of 325 ppm and 60 ppm, respectively. The samples were submitted to the laboratory for pH, metals, VOCs, and TPH analysis.

One boring was drilled in the milling/machine area located in the northwest end of Building 7B. Boring HA-7B-8-1 was drilled to a total depth of approximately 9.0 feet, where the hand auger was denied. Soil samples were collected from depths of 2.5 and 7.5 feet with corresponding PID readings of 450 ppm and 200 ppm, respectively. Both soil samples were submitted for laboratory analysis for pH, metals, VOCs, and TPH.

Building 7C

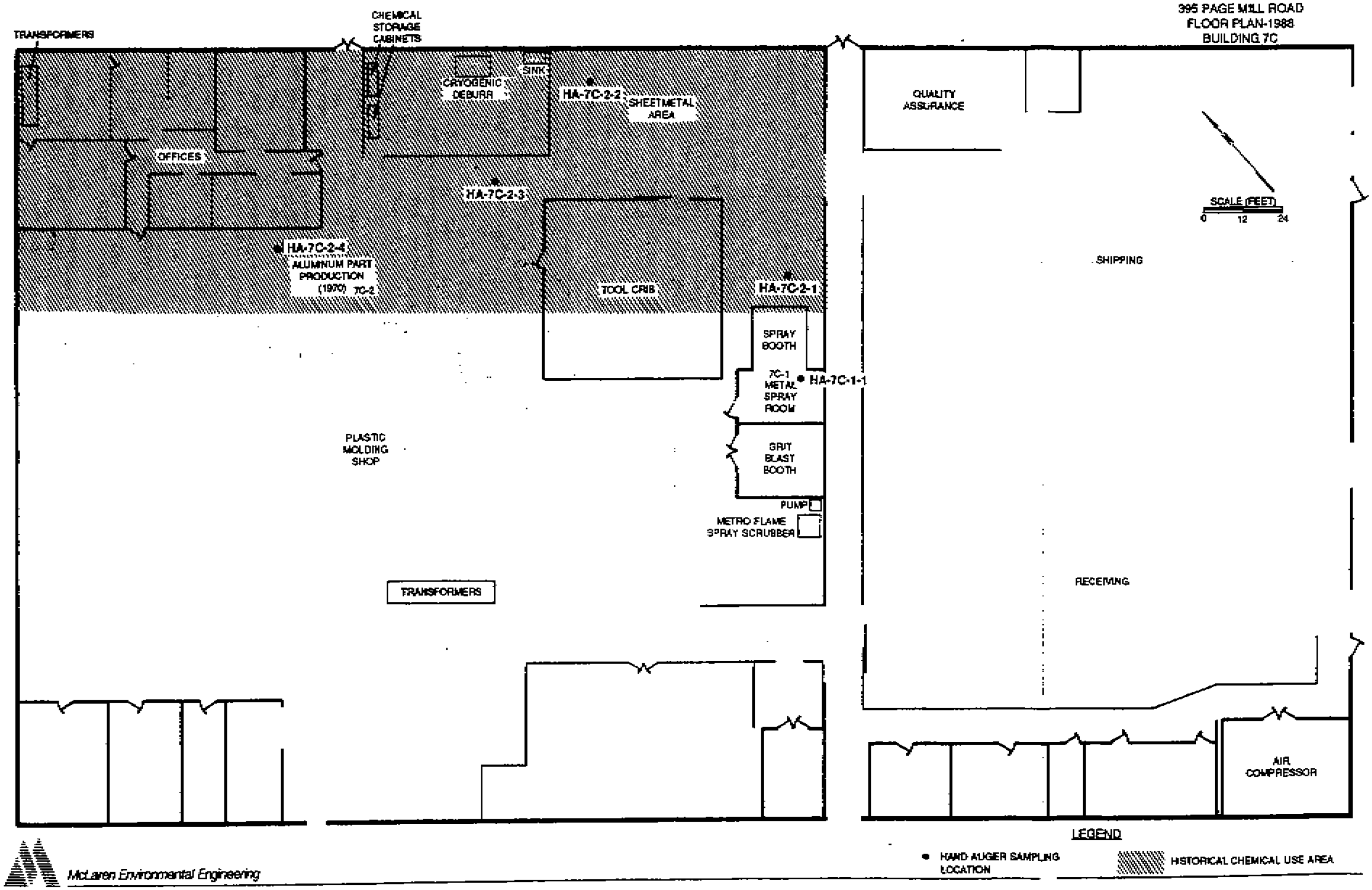
Seven soil borings were drilled inside and adjacent to Building 7C to address potential source areas. The locations of the soil borings and chemical use areas investigated are shown in Figure 7.

One soil boring was drilled in the metal spray room located in the central portion of Building 7C. Boring HA-7C-1-1 was drilled to a total depth of 9.5 feet below grade. Soil samples collected from depths of 2.5 and 9.0 feet were submitted to the laboratory for pH, metals, and VOC analyses.

Four soil borings were drilled in the northwest portion of Building 7C to address the aluminum part production area formerly located in this portion of the building. Boring HA-7C-2-1, located north of the paint spray booth and east of the tool crib, was drilled to a total depth of 3.5 feet below grade where the hand auger was denied by gravel. One soil sample was collected from a depth of 3.0 feet and submitted for laboratory analysis for pH, metals and VOCs. Borings HA-7C-2-2, HA-7C-2-3, and HA-7C-2-4, located in the current sheet metal production area, were each drilled to a total depth of 9.5 feet below grade. Soil samples collected from depths of 4.0 and 9.0 feet, from depths of 3.5 and 9.0 feet, and from depths of 4.0 and 9.0 feet from borings HA-7C-2-2, HA-7C-2-3 and HA-7C-2-4, respectively, were submitted for laboratory analysis for pH, metals and VOCs.

Two soil borings were drilled in the area between Buildings 7B and 7C. The area was formerly used for gas cylinder storage, however, the possibility exists that the area may also have been used for chemical storage. In addition, one hand auger boring was drilled adjacent to a sanitary sewer line which was historically, and is currently connected to the sump located at the northeastern corner of Building 7B. Boring HA-7C-4-1 was drilled adjacent to the northwest exterior corner of Building 7B to a total depth of 7.5 feet below grade, where the hand auger was denied by rock. Soil samples were collected from depths of 1.0 and 6.0

FIGURE 7
HEWLETT-PACKARD COMPANY
395 PAGE MILL ROAD
FLOOR PLAN-1988
BUILDING 7C



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feet and were submitted for analysis for pH, metals, and VOCs. Boring HA-7C-4-2 was drilled near the sanitary sewer and heating, ventilation, and air-conditioning system, to a total depth of 9.5 feet below grade. Soil samples collected from depths of 4.0 and 9.0 feet were submitted for pH, metals, and VOC analysis.

Building 7D

A total of 10 soil borings were drilled inside and adjacent to Building 7D to address potential source areas. The soil boring locations and chemical use areas investigated are shown in Figure 8.

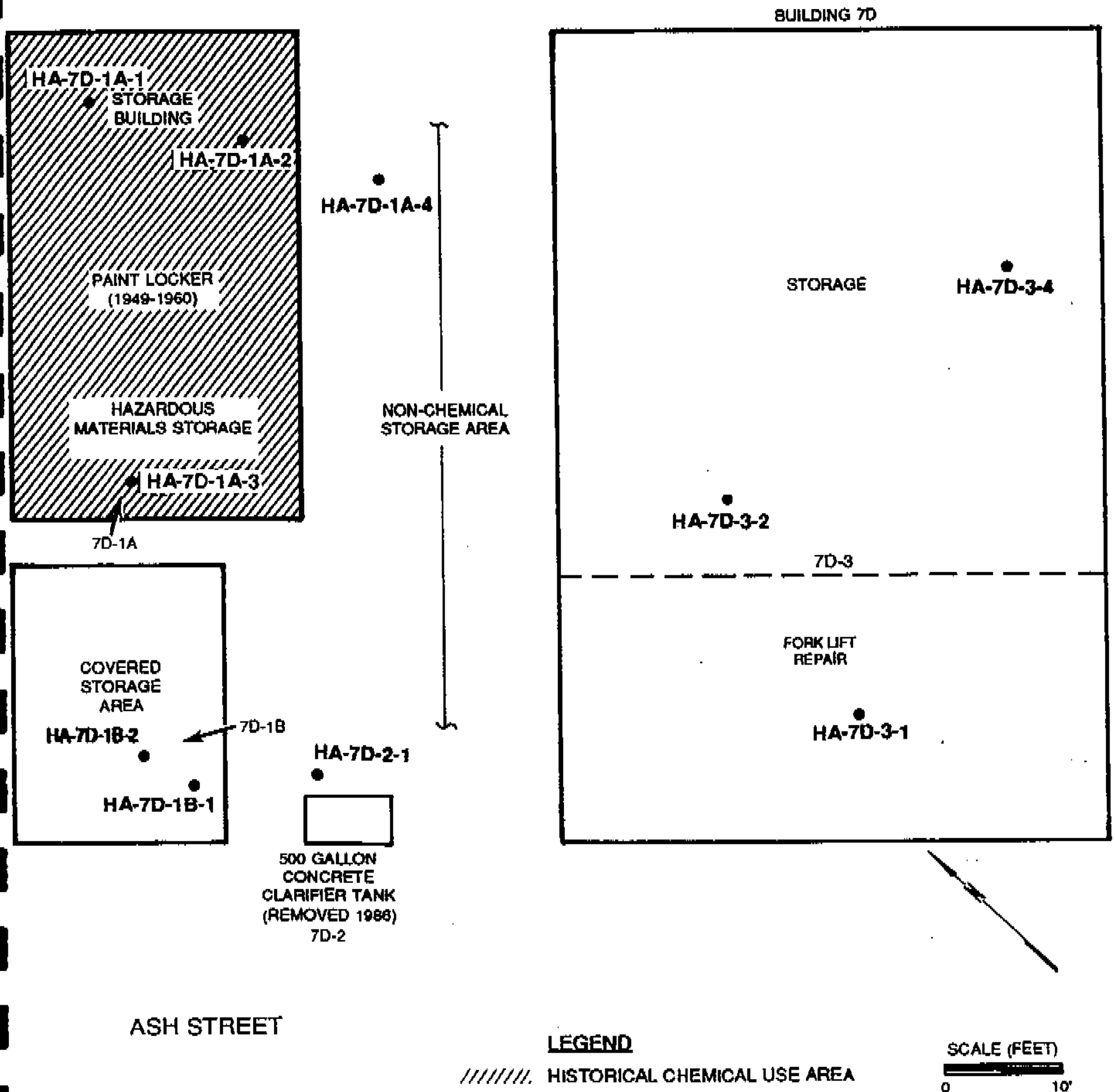
Four soil borings were drilled inside and adjacent to the enclosed storage room located between Building 7D and Building 7A, to address former usage of this room for paint and hazardous materials (including waste) storage. Borings HA-7D-1A-1, HA-7D-1A-2, and HA-7D-1A-3 were drilled within the interior of the storage room to total depths of 9.5, 7.5, and 9.5 feet below grade, respectively. The hand auger was denied by gravel at a depth of 7.5 feet below grade in boring HA-7D-1A-2. Soil samples collected from depths of 1.5 and 6.5 feet from borings HA-7D-1A-1 and HA-7D-1A-2, and samples collected from depths of 1.0 and 9.0 feet from boring HA-7D-1A-3 were submitted for laboratory analysis for pH, metals, VOCs and TPH. Boring HA-7D-1A-4 was drilled east of the enclosed storage room in the wood shop area. Boring HA-7D-1A-4 was drilled to a total depth of 8.5 feet below grade and elevated PID reading were encountered during drilling of the borehole. Soil samples were collected from depths of 1.0, 6.0, and 8.0 feet with corresponding PID readings of 428 ppm, 170 ppm, and 51 ppm, respectively. The samples collected from depths of 1.0 and 8.0 feet were submitted for pH, metals, VOCs, and TPH analysis.

Two soil borings were drilled in the covered storage area west of Building 7D. Borings HA-7D-1B-1 and HA-7D-1B-2 were each drilled to a total depth of 9.5 feet below grade. The soil samples collected from depths of 1.0 and 9.0 feet below grade from each boring were submitted for laboratory analysis for pH, metals, and VOCs.

One soil boring was drilled adjacent to the former location of the concrete clarifier. This 500 gallon structure was removed in 1986 at which time soil samples were collected and submitted for VOC analysis; no VOCs were detected. Boring HA-7D-2-1 was drilled to a total depth of 9.5 feet below grade. Soil samples collected from depths of 1.0 and 9.0 feet were submitted for laboratory analysis for pH, metals, and VOCs.

Three borings were completed inside the Building 7D quonset hut to address the foundry and die cast operations formerly located in the building. Boring HA-7D-3-1 also addresses the current fork lift repair area. Borings HA-7D-3-1, HA-7D-3-2, and HA-7D-3-4 were drilled to total depths of 9.0, 9.5, and 9.5 feet below grade, respectively. Boring HA-7D-3-3 which was also located in the quonset hut was denied by cobbles and no soil samples were collected. Soil samples collected from depths of 1.0 and 8.5 feet below grade from boring HA-7D-3-1, 1.5, and 9.0 feet from

FIGURE 8
HEWLETT-PACKARD COMPANY
395 PAGE MILL ROAD
FLOOR PLAN-1988
BUILDING 7D



LEGEND

//////// HISTORICAL CHEMICAL USE AREA

● HAND AUGER SAMPLING LOCATION (SEE TABLE 2)

NOTE: 7D-4 SHOWN ON FIGURE 7

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Boring HA-7D-3-2, and from depths of 1.0 and 9.0 from boring HA-7D-3-4 were submitted for laboratory analysis for pH, metals, VOCs, and TPH.

Former Building 7E

Soil boring locations for former Buildings 7E, 7F, and 7G are shown on Figure 2. Historical chemical use areas for these buildings are depicted in Figure 4.

A total of five soil borings were drilled in the parking lot south of Building 12 and west of the Chemical Storage Building to address Building 7E, formerly located in this area. Building 7E housed die cast operations, which included a foundry, drilling, and machining operations.

Soil boring SB-7E-2 was drilled to a total depth of 21.5 feet below grade, and saturated conditions were encountered at a depth of approximately 19.5 feet below grade. Elevated PID readings were encountered near the surface of the boring. Soil samples were collected from depths of 2.0, 6.0, 11.0, 16.0, and 20.5 feet, with corresponding PID readings of 78 ppm, 70 ppm, 2.1 ppm, 1.0 ppm, and 1.2 ppm, respectively. The samples collected from depths of 2.0 and 11.0 feet below grade were submitted to the laboratory for pH, metals, and TPH analysis. The samples collected from depths of 6.0 and 16.0 feet were submitted for TPH analyses. The 20.5-foot sample was submitted for pH and metals analysis.

Boring SB-7E-3 was drilled to a total depth of 25.5 feet below grade, and saturated conditions were encountered at a depth of 25.0 feet below grade. Soil samples were collected from depths of 2.0, 6.0, 11.0, 16.0, 21.0, and 26.0 feet. Samples collected from depths of 2.0, 16.0, and 26.0 feet below grade were submitted to the laboretory for pH and metals analysis.

Boring SB-7E-4 was drilled to a total depth of 25.0 feet below grade and saturated conditions were encountered at a depth of 21.0 feet. Slightly elevated PID readings were detected near the surface of the borehole. The soil sample collected from a depth of 3.5 feet had a PID reading of 35 ppm and was submitted for laboratory analysis for pH and metals. The sample collected from a depth of 6.0 feet had a PID reading of 30 ppm and was submitted for VOC analysis. The sample collected from a depth of 11.0 feet was submitted for pH, metals, and VOC analyses. The sample collected from a depth of 16.0 feet below grade was submitted for VOC analysis, and the 21.0-foot sample was submitted for pH and metals analysis.

Boring SB-7E-5 was drilled to a total depth of 25.0 feet below grede and saturated conditions were encountered at a depth of 20.0 feet. Soil samples were collected from depths of 2.0, 6.0, 11.0, 16.0, and 21.0 feet below grade. The sample collected from a depth of 2.0 feet was submitted to the laboretory for pH and metels analysis. The samples collected from depths of 6.0 and 16.0 feet below grade were submitted for VOC analysis. The samples collected from depths of 11.0 and 21.0 feet below grade were submitted for analysis for pH, metals, and VOCs.

Boring SB-7E-6 was drilled to a total depth of 23.5 feet below grade and saturated conditions were encountered at a depth of 22.0 feet. Slightly elevated PID readings were detected during drilling of the borehole. Soil samples were collected from depths of 2.5, 6.0, 11.0, 16.0, 21.0, and 22.0 feet below grade with corresponding PID readings of 23 ppm, 21 ppm, 5.5 ppm, 7.0 ppm, 3.5 ppm, and 3.5 ppm, respectively. Soil samples collected from depths of 2.5, 11.0, and 22.0 feet below grade were submitted for laboratory analysis for pH, metals, VOCs, and TPH. Samples collected from depths of 6.0 and 16.0 feet below grade were submitted for VOC and TPH analysis.

Former Building 7F

A total of eight soil borings were drilled in the parking lot near the corner of Ash Street and Olive Avenue, and parallel to Olive Avenue, to address Building 7F formerly located in this area. Building 7F housed a welding shop, carpentry shop, and custodial and maintenance supply storage areas. A storage shed is reported to have been previously located northwest of the building. Prior to occupancy by Hewlett-Packard, a mill is reported to have been located in the vicinity of Building 7F. A gasoline tank is reported to have been in use at the mill. The locations of the soil borings are shown on Figure 4. Boring SB-7F-1 was drilled in the vicinity of the former gasoline tank, to a total depth of 21.5 feet below grade. Saturation was encountered at a depth of 20.0 feet. Soil samples were collected from depths of 2.0, 6.0, 11.0, 16.0, and 21.0 feet. The samples collected from depths of 2.0 and 21.0 feet were submitted to the laboratory for pH and metals analysis. The soil samples collected from depths of 6.0 and 16.0 feet were submitted for TPH analysis. The soil sample collected from a depth of 11.0 feet was submitted for pH, metals, and TPH analysis.

Soil Boring SB-7F-2 and boring SB-7F-3 were drilled in the southern corner of the parking lot to address the welding shop and maintenance supply storage area formerly located in this vicinity. Boring SB-7F-2 was drilled to a total depth of 21.5 feet below grade and saturated conditions were encountered at a depth of 19.5 feet. Soil samples were collected from depths of 2.0, 6.0, 11.0, 16.0, and 21.0 feet below grade. The samples collected from depths of 2.0 and 21.0 feet were submitted to the laboratory for pH and metals analysis. Samples collected from depths of 6.0 and 16.0 were submitted for VOC analysis. The soil sample collected from a depth of 11.0 feet was submitted for pH, metals, and VOC analysis.

Soil Boring SB-7F-3 was drilled to a total depth of 22.0 feet below grade and saturation was encountered at a depth of 21.0 feet. Soil samples were collected from depths of 3.0, 6.0, 11.0, 16.0, and 21.0 feet below grade. The samples collected from depths of 3.0 and 21.0 feet were submitted for laboratory analysis for pH and metals. The samples collected from depths of 6.0 and 16.0 feet were submitted for TPH analysis. The sample collected from 11.0 feet below grade was submitted for pH, metals, and TPH analysis.

Soil Borings SB-7F-4 and SB-7F-6 were drilled to address the former lumber mill which occupied the site prior to Hewlett-Packard. Boring SB-7F-4 was drilled to a total depth of 21.5 feet below grade and saturated conditions were encountered at a depth of 19.5 feet. Soil samples collected from depths of 2.0 and 20.5 feet were submitted for pH and metals analysis. Samples collected from depths of 6.0 and 16.0 feet were submitted for VOC analysis. The sample collected from 11.0 feet was submitted for pH, metals, and VOC analysis.

Boring SB-7F-6 was drilled to a total depth of 22.0 feet below grade and saturation was encountered at a depth of 20.0 feet. The soil samples collected from depths of 1.5 and 21.0 feet were submitted for pH and metals analysis. The samples collected from depths of 6.0 and 16.0 feet were submitted for TPH analysis. The sample collected from a depth of 11.0 feet was submitted for pH, metals, and TPH analysis.

Soil Boring SB-7F-5 was drilled in the vicinity of the former chemical storage shed. Boring SB-7F-5 was drilled to a total depth of 21.5 feet and saturation was encountered at a depth of 19.5 feet. The soil samples collected from depths of 2.0 and 20.5 were submitted for pH and metals analysis. The samples collected from depths of 6.0 and 16.0 were submitted for TPH analysis. The sample collected from a depth of 11.0 feet was submitted for pH, metals, and TPH analysis.

Soil Boring SB-7F-7 was drilled to address the former maintenance supply storage area of Building 7F and a storm drain. Boring SB-7F-7 was drilled to a total depth of 22.0 feet below grade and saturated conditions were encountered at a depth of 19.0 feet. The samples collected from depths of 6.0, 11.0, 16.0, and 21.0 were submitted for VOC and TPH analysis.

Soil Boring SB-7F-8 was drilled to address the former custodial supply storage area of Building 7F. The boring was drilled to a total depth of 22.0 feet below grade and saturation was encountered at a depth of 20.0 feet. The soil samples collected from depths of 2.0, 11.0, and 21.0 feet below grade were submitted for pH, metals, VOCs, and TPH analysis. Samples collected from depths of 6.0 and 16.0 feet were submitted for VOC and TPH analysis.

Former Building 7G

Eight soil borings were drilled in the parking lot east of the Chemical Storage Building to address potential source areas in Building 7G, which was formerly located in this area. Operations reported to have been conducted in Building 7G include solid state research and development, and semi-conductor manufacturing. Reportedly, a machine shop and a paint shop were also located in Building 7G. A sump is reported to have existed on the northeast side of Building 7G. An open air flammable storage shed is reported to have been located southwest of Building 7G. The locations of the soil borings are shown in Figure 4.

Soil Borings SB-7G-1, SB-7G-2, SB-7G-3, and SB-7G-6 address Building 7G and the operations conducted within the building. Borings SB-7G-4, and

SB-7G-5 address the sump formerly located on the northeast side of Building 7G. Borings SB-7G-7 and SB-7G-8 address the former open air flammable storage shed.

Soil boring SB-7G-1 was drilled to a total depth of 22.0 feet below grade and saturated conditions were encountered at a depth of 21.0 feet. Soil samples collected from depths of 2.5, 11.0, and 21.0 feet below grade were submitted for pH and metals analysis.

Boring SB-7G-2 was drilled to a total depth of 22.0 feet and saturation was encountered at a depth of 21.0 feet. Soil samples collected from depths of 3.0 and 21.0 feet were submitted to the laboratory for pH and metals analysis. Samples collected from depths of 6.0 and 16.0 feet were submitted for VOC analysis. The sample collected from a depth of 11.0 feet was submitted for pH, metals, and VOC analysis.

Boring SB-7G-3 was drilled to a total depth of 22.0 feet and saturation was encountered at a depth of 20.0 feet. The soil sample collected from a depth of 2.0 feet was submitted to the laboratory for pH and metals analysis. The samples collected from depths of 6.0 and 11.0 feet were submitted for VOC analysis. The samples collected from depths of 16.0 and 21.0 feet were submitted for pH, metals, and VOC analysis.

Soil Boring SB-7G-4 was completed to a total depth of 22.0 feet below grade and saturated conditions were encountered at a depth of 20.0 feet. The soil samples collected from depths of 6.0 and 21.0 feet were submitted for laboratory analysis for pH and metals. The samples collected from depths of 6.0 and 16.0 were submitted for VOC analysis. The sample collected from a depth of 11.0 feet was submitted for pH, metals, and VOC analysis.

Boring SB-7G-5 was completed to at total depth of 22.0 feet below grade and saturation was encountered at a depth of 20.0 feet. The samples collected from depths of 6.0, 11.0, and 16.0 feet below grade were submitted for VOC and TPH analysis. The sample collected from a depth 21.0 feet was submitted for TPH analysis.

Soil Boring SB-7G-6 was drilled to a total depth of 22.0 feet below grade and saturation was encountered at a depth of 20.0 feet. The soil sample collected from a depth of 1.5 feet was submitted for pH and metals analysis. The sample collected from a depth of 6.0 feet was submitted for TPH analysis. The samples collected from depths of 11.0 and 16.0 feet were submitted for pH, metals, and TPH analysis.

Boring SB-7G-7 was completed to a total depth of 22.0 feet below grade and saturation was encountered at a depth of 21.0 feet. The soil sample collected from a depth of 2.5 feet was submitted for laboratory analysis for pH and metals. The samples collected from depths of 6.0 and 16.0 feet were submitted for VOC analysis. The soil samples collected from depths of 11.0 and 21.0 feet were submitted for pH, metals, and VOC analysis.

Soil Boring SB-7G-8 was drilled to a total depth of 22.0 feet below grade and saturated conditions were encountered at a depth of 20.0 feet. The samples collected from depths of 6.0, 11.0, 16.0, and 21.0 feet below grade were submitted for VOC and TPH analysis.

Building 12

A total of eight soil borings were completed inside and adjacent to Building 12 to address potential source areas. The locations of the soil borings and the chemical use areas investigated are shown in Figure 9.

One soil boring was completed in the central portion of Building 12U to address the brite dip plating line. Boring HA-12U-3-1 was drilled to a total depth of 9.5 feet below grade. Soil samples were collected at depths of 4.0 and 9.0 feet and submitted for laboratory analysis for pH, metals, and VOCs. Initially an angle boring of 45 degrees was attempted to obtain soil samples from directly beneath the brite dip line. This boring, as well as an additional angle boring and a vertical boring, were denied by gravel within the artificial fill material located directly beneath the concrete and no soil samples were collected.

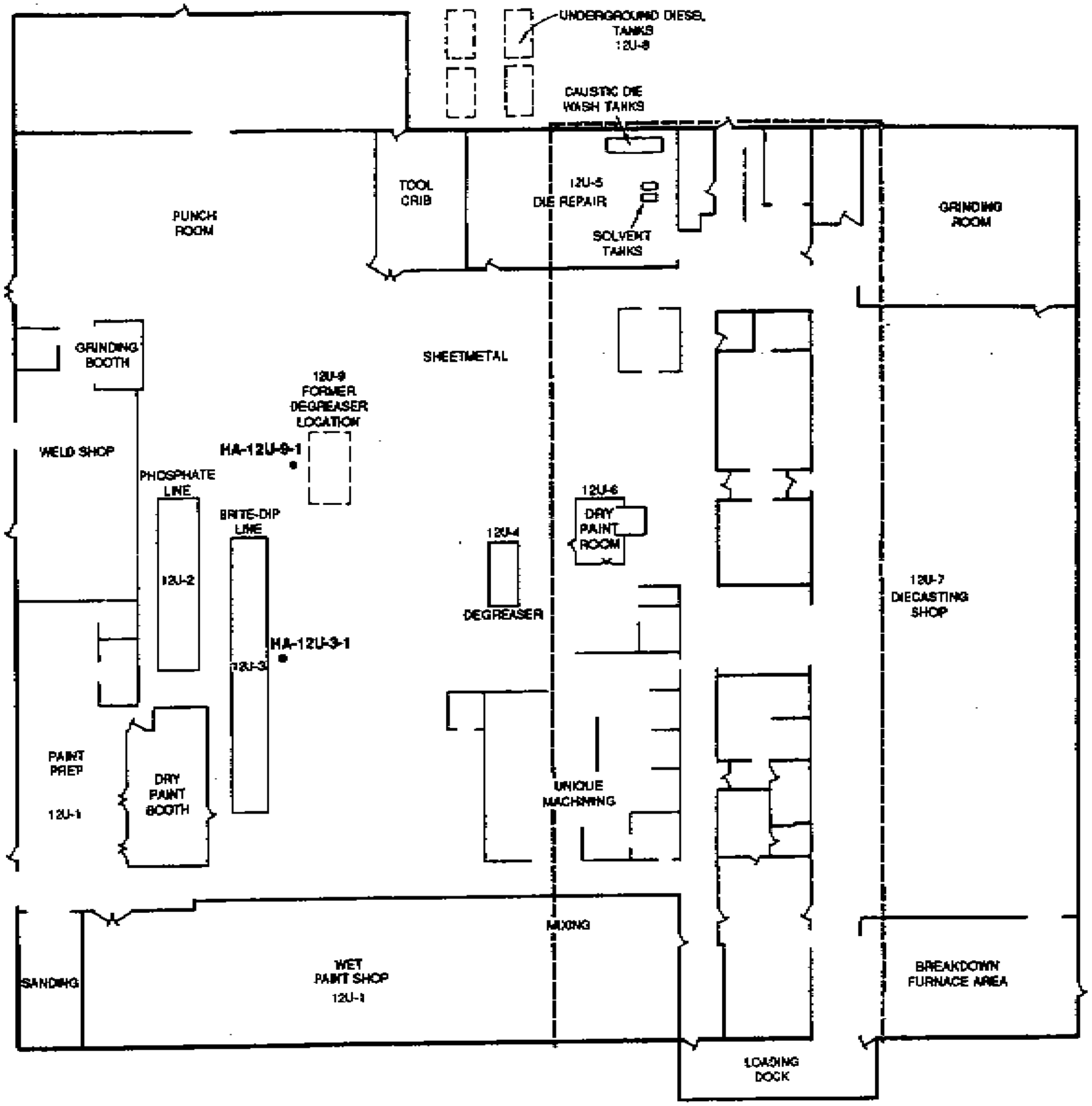
One soil boring was attempted adjacent to the 1,1,1-Trichloroethane (TCA) degreaser located in the central portion of Building 12U, and another in the die casting shop at the east end of the building. Both of these borings were denied by gravel within the fill material located directly beneath the concrete. McLaren recommends that a boring be completed adjacent to this degreaser.

Soil boring HA-12U-9-1 was drilled adjacent to the former location of the tetrachloroethene (PCE) degreaser. Soil samples were collected from depths of 4.5 and 9.5 feet with corresponding PID readings of 65 ppm and 160 ppm, respectively. Both samples were submitted for analysis for pH, metals and VOCs.

Soil boring SB-12-1 was drilled near the corner of Park Boulevard and Olive Avenue, approximately 15 feet north of monitoring well W-12. Boring SB-12-1 was drilled to a total depth of 25.0 feet below grade and saturated conditions were encountered at a depth of approximately 23.5 feet. Elevated PID readings were detected during drilling of the boring. Soil samples were collected at depths of 2.0, 6.0, 11.0, 16.0, 21.0, and 24.0 feet below grade with corresponding PID readings of 2.0 ppm, 2.0 ppm, 140 ppm, 100 ppm, 45 ppm, and 13 ppm, respectively. The sample collected from a depth of 2.0 feet was submitted for laboratory analysis for pH and metals. The samples collected from depths of 6.0, 21.0, and 24.0 feet were submitted for VOC analysis. The sample collected from the 11.0-foot depth was submitted for pH, metals, and VOC analysis.

Soil boring SB-12-2 was drilled approximately 15 feet south of monitor well W-12. The boring was drilled to a total depth of 26.5 feet below grade with saturated conditions encountered at a depth of 25.0 feet. Elevated PID readings were detected during drilling of the boring. Soil samples were collected at depths of 2.0, 5.5, 11.0, 16.0, 21.0, and 25.5

FIGURE 9
HEWLETT-PACKARD COMPANY
395 PAGE MILL ROAD
FLOOR PLAN-1988
BUILDING 12



SCALE (FEET)
0 25'

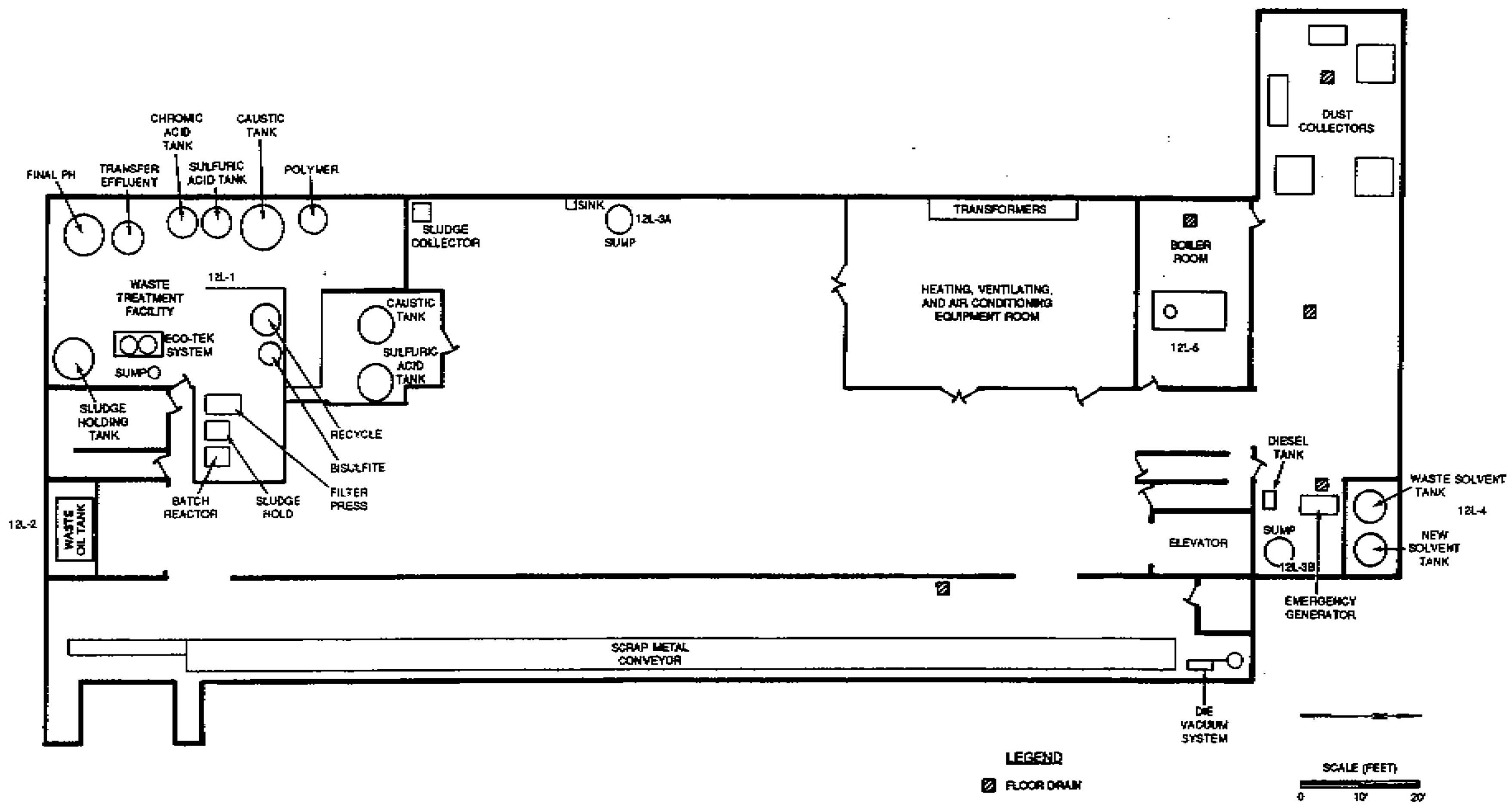
LEGEND

BASEMENT

• HAND AUGER SAMPLING LOCATION (SEE TABLE 2)

McLaren Environmental Engineering

FIGURE 10
HEWLETT-PACKARD COMPANY
395 PAGE MILL ROAD
BASEMENT FLOOR PLAN-1988
BUILDING 12



McLaren Environmental Engineering

feet below grade with PID readings of 2.0 ppm, 7.0 ppm, 50 ppm, 110 ppm, 10 ppm, and 2.5 ppm, respectively. The sample collected from a depth of 2.0 feet was submitted to the laboratory for pH and metals analysis. The sample collected from a depth of 5.5 feet was submitted for VOC analysis. The samples collected from depths of 16.0 and 25.5 feet were submitted for pH, metals, and VOC analysis.

Three soil borings SB-12-3, 12-4, and 12-5, were drilled adjacent to the southern exterior walls of Building 12 to address the chemical use areas in the basement of Building 12. These facilities are shown on Figure 10.

Boring SB-12-3 was drilled outside and adjacent to the east wall of Building 12. The boring was completed to a total depth of 26.5 feet below grade and saturated conditions were encountered at a depth of 25.0 feet. The soil sample collected from a depth of 2.5 feet was submitted for pH and metals analysis. The soil samples collected from depths of 6.0 and 21.0 feet were submitted for VOC analysis. The samples collected from depths of 11.0 and 26.0 feet were submitted for pH, metals, and VOC analysis.

Boring SB-12-4 was drilled near the exterior southeast corner of the building. Boring SB-12-4 was drilled to a total depth of 25.0 feet below grade and saturation was encountered at a depth of 24.5 feet. The soil sample collected from a depth of 3.0 feet was submitted for laboratory analysis for pH and metals. The samples collected from depths of 6.0 and 21.0 feet were submitted for VOC analysis. The samples collected from depths of 11.0 and 24.0 feet were submitted for pH, metals, and VOC analysis.

Soil boring SB-12-5 was drilled adjacent to the loading dock on the south wall of Building 12 and adjacent to sanitary sewer and storm drains from Building 12. The boring was completed to a total depth of 25.0 feet below grade and saturation was encountered at a depth of 23.5 feet. The soil sample collected from a depth of 1.5 feet was submitted for pH and metals analysis. The sample collected from a depth of 6.0 feet was submitted for TPH analysis. The samples collected from depths of 11.0 and 21.0 feet were submitted for analysis for pH, metals, VOCs, and TPH. The sample collected from a depth of 24.0 feet was submitted for pH, metals, and TPH analysis.

Boring SB-12-6 was drilled near the northeast corner of Building 12 to address the solvent storage tanks located in the below grade areaway of Building 12. Boring SB-12-6 was drilled to a total depth of 25.0 feet below grade and saturation was encountered at a depth of 23.5 feet. The soil sample collected at a depth of 2.5 feet was submitted for laboratory analysis for pH and metals. The samples collected from depths of 11.0, 21.0, and 24.0 feet below grade were submitted for pH, metals, and VOC analysis.

Chemical Storage Building

Three soil borings were completed adjacent to the Chemical Storage Building. One additional hand auger boring was attempted inside the building, however, the hand auger was denied by gravel within the fill material directly beneath the concrete floor. The locations of the soil borings and the Chemical Storage Building are shown in Figure 4.

Boring SB-CS-1 was drilled near the northwest corner of the Chemical Storage Building adjacent to the former underground waste solvent tank and abandoned soil vapor extraction wells. The soil samples collected from depths of 2.5 and 21.0 feet below grade were submitted for laboratory analysis for pH and metals. The samples collected from depths of 6.0 and 16.0 feet were submitted for VOC analysis. The sample collected from a depth of 11.0 feet was submitted for pH, metals, and VOC analysis.

Two soil borings were drilled adjacent the northeast wall of the building, approximately 10 feet horizontally from the building. These two borings were drilled at a 45 degree angle to obtain soil samples from directly beneath the building. Sample depths are given in true vertical depth.

Boring SB-CS-2 was drilled at a 45 degree angle, approximately 10 feet northeast of the building. The boring was drilled to a total depth of 21 feet below grade and saturated conditions were encountered at a depth of 20.5 feet. Soil samples were collected at depths of 5, 7, 10, 14, 18, and 20 feet below grade. Laboratory analyses were performed on the samples collected from 14, 18, and 20 feet for pH, metals, and VOCs. The 7 foot sample was analyzed for pH and metals.

Boring SB-CS-3 was drilled at a 45 degree angle, approximately 10 feet northeast of the building, to a total depth of 19.10 feet below grade. Saturated conditions were not encountered in the borehole. The extremely gravelly nature of the soil encountered at this location caused the augers to bow and prevented sampling beyond a depth of 19 feet. Soil samples were collected at depths of 4, 7, 11, 14, and 18 feet below grade. Samples collected from depths of 7, 14, and 18 feet were submitted for pH, metals, and VOC analyses.

Background Sampling

Two soil borings were completed to obtain background soil samples. These samples are used to compare naturally occurring pH values and metal concentrations in the non-chemical use areas at the site with results of pH and metal analyses from chemical use areas. The background soil borings were drilled in the landscaped area west of Building 8. The background soil boring locations are shown in Figure 2.

Borings HA-BKG-1 and HA-BKG-2 were each drilled to a total depth of 9.5 feet below grade. Soil samples collected from depths of 1.5 and 9.0 feet below grade from each boring were submitted for laboratory analysis for pH and metals.

MONITOR WELL GROUNDWATER SAMPLING

Groundwater samples were collected for metal analyses from all existing on-site monitor wells on August 23, 1989, November 21, 22, 30, 1989, February 22, 26, 27, 1990, and March 1, 6, 7, 1990. Prior to sampling, a minimum of three casing volumes of groundwater were purged from each well casing using either a submersible, peristaltic, or centrifugal pump, or a teflon bailer. After each well volume was purged, measurements of pH, electrical conductivity, turbidity and temperature were recorded. No samples were collected until three consecutive casing volumes had consistent physical parameter (≤5% variation). Samples were collected and placed in polypropolene containers preserved with nitric acid except samples to be analyzed for chromium VI which were not preserved. Samples were stored on ice and sent via an overnight delivery service to CHEMWEST Analytical Laboratory using proper chain-of-custody procedures. Prior to analysis the samples were laboratory filtered.

No!

RESULTS OF FIELD INVESTIGATIONS

The results of the source area identification investigation are presented in this section of the report. This section discusses the site geology and presents the results from soil analyses, the soil gas survey, the Building 12 sump inspections, the grab water samples and monitoring well groundwater samples.

SITE GEOLOGY

The site is underlain by Quaternary-age (Holocene) alluvial deposits consisting of admixtures of gravel, sand, silt and clay. This valley alluvium has been deposited principally as a series of coalescing alluvial fans which descend from the highlands to the west. The alluvium is unconsolidated (Dibblee, Jr., J.W. 1966, and Pampeyan, E.H., 1970).

Three generalized geologic cross-sections were prepared based on lithologic data from the hollow stem auger soil borings. The locations of the cross-sections are shown on Figure 2. The cross-sections, Sections A-A', B-B', and C-C' are shown on Figures 11, 12, and 13, respectively.

Four major geologic units are identified on the cross-sections. The distinction of geologic units is based on the Unified Soil Classification System and descriptions of soil color, gravel content and the presence of calcium carbonate concretions.

Fill Material

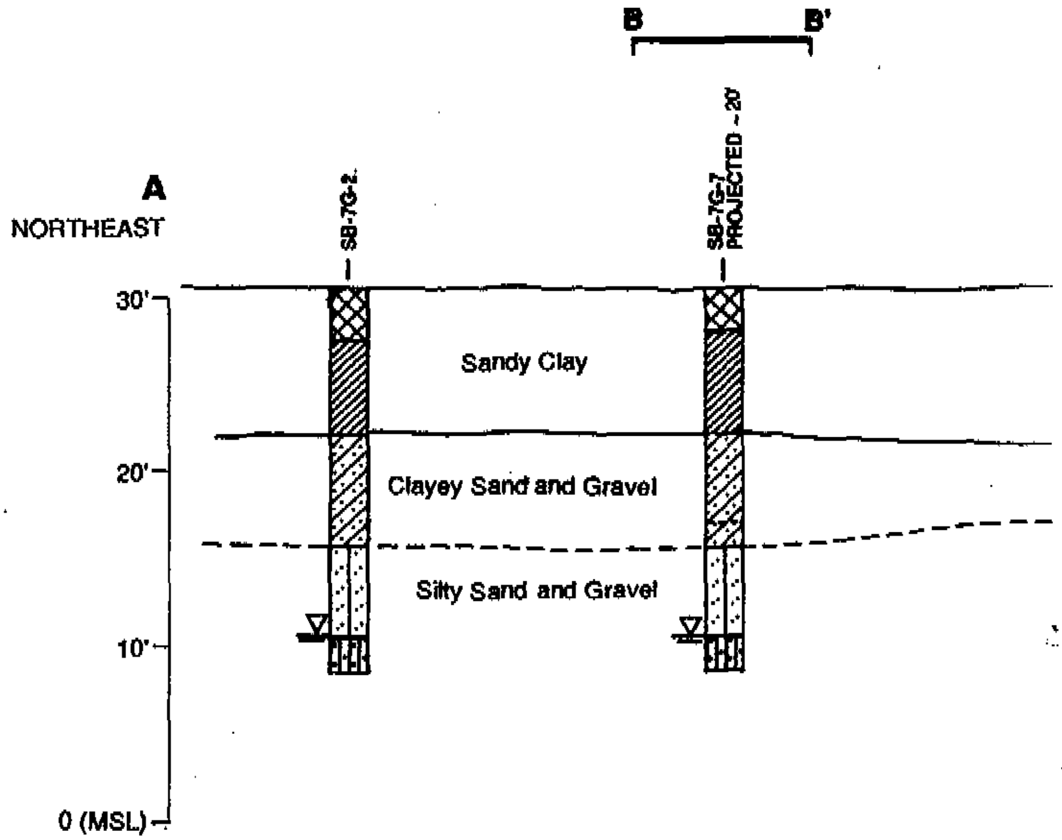
Directly beneath the asphalt pavement one to three feet of artificial fill material is present. The fill material underlies the entire site and consists of gravelly sand admixtures (class II aggregate base).

Sandy Clay (Unit A)

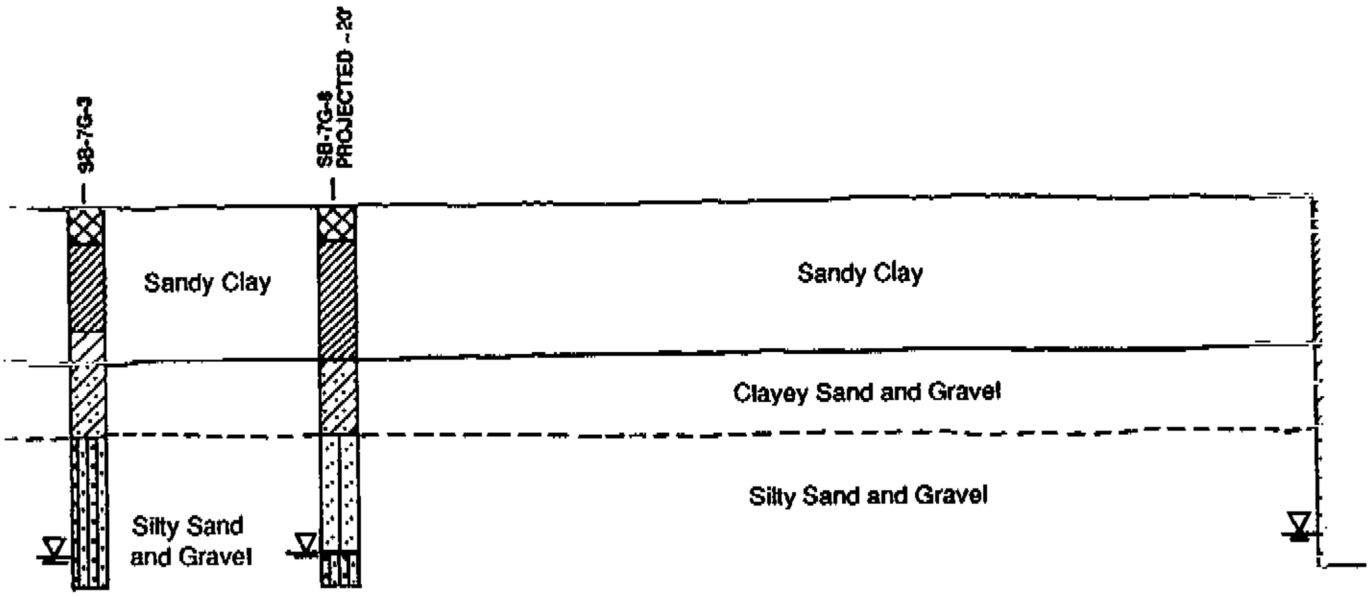
The first geologic unit encountered, referred to as Unit A on cross-sections, is a fine grained clayey unit with 15 to 35 percent included very fine grained sand. This unit is defined by Unified Soil Classification System (USCS) nomenclature as a sandy clay. Previous reports and work by others have identified this unit as a silty clay. Unit A is laterally continuous throughout the site and is distinguished by a dark gray and very dark gray color and moderately to highly plastic fines. Unit A varies in thickness from five to eleven feet and extends from the base of the artificial fill material to depths ranging from six to twelve feet.

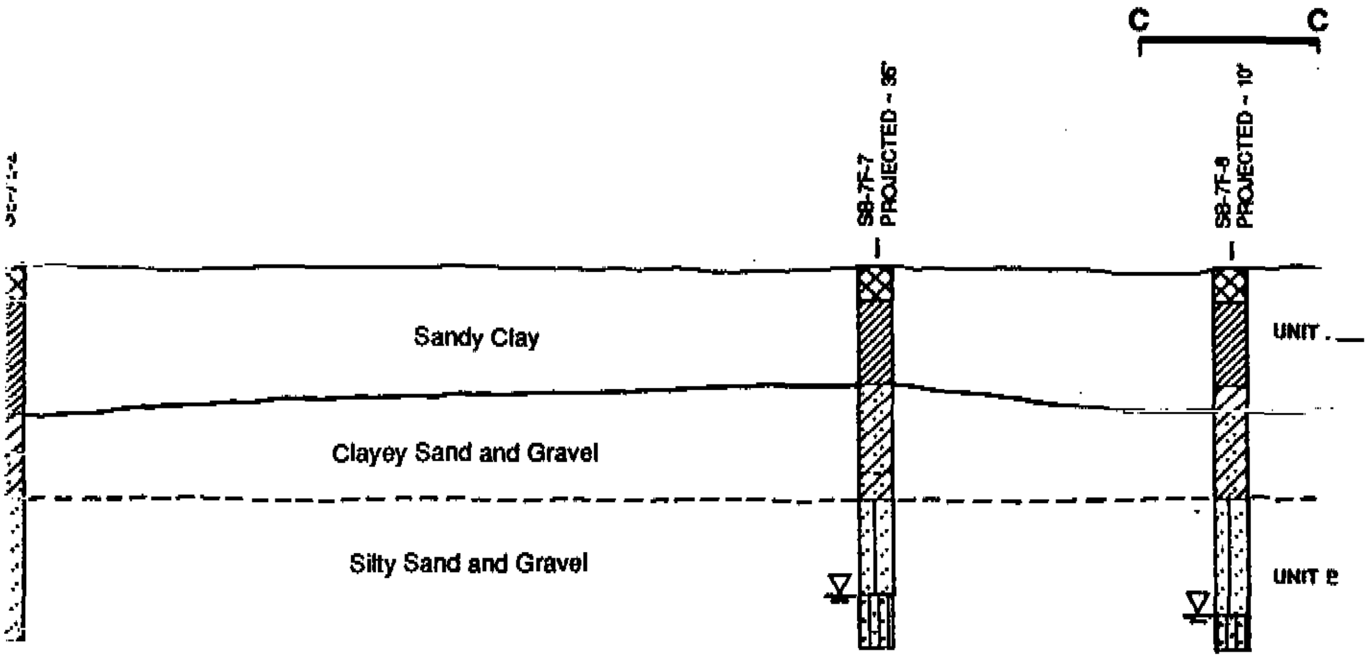
Clayey and Silty Sand and Gravel (Unit B)

The second geologic unit, referred to as Unit B on cross-sections, is a coarse grained sandy unit with variable mixtures of silty and clayey fines and gravel. This unit is distinguished by the presence of gravel sized


B
B'
A
NORTHEAST
SB-7G-2
SB-7G-7
PROJECTED ~ 20'
30'
20'
10'
0 (MSL)
Sandy Clay
Clayey Sand and Gravel
Silty Sand and Gravel

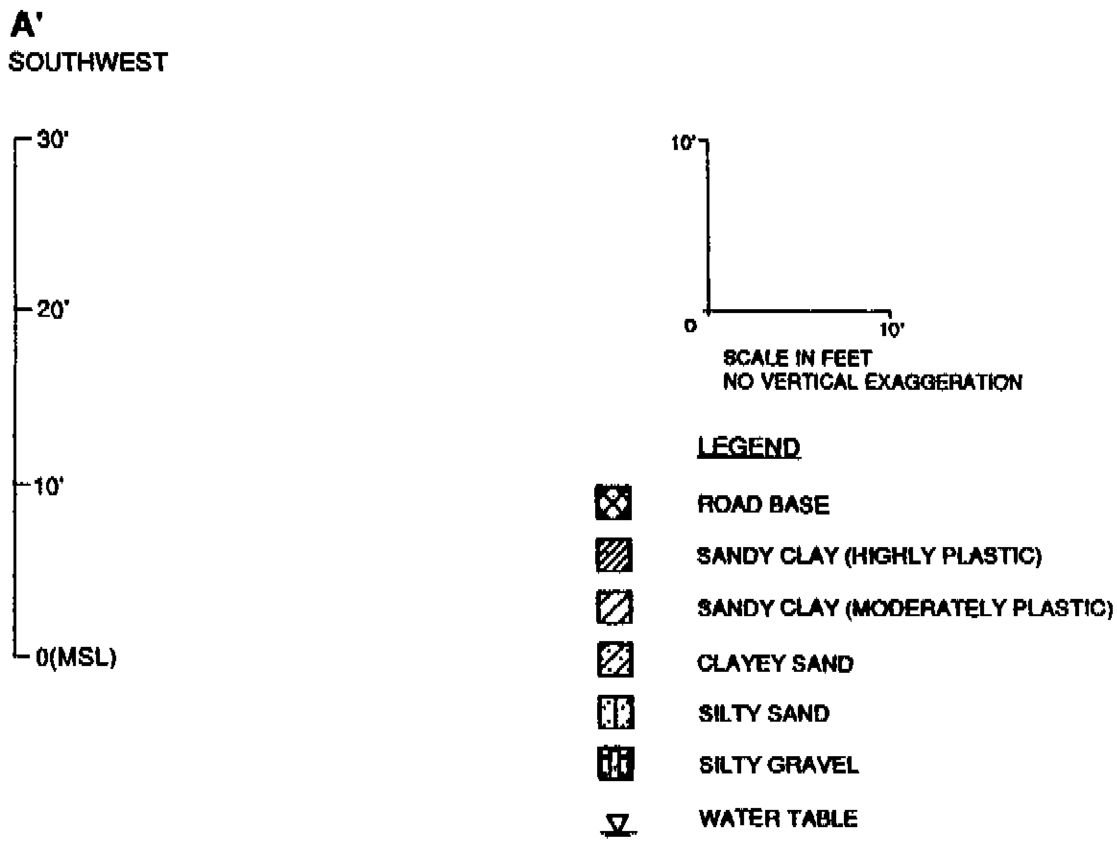
McLaren

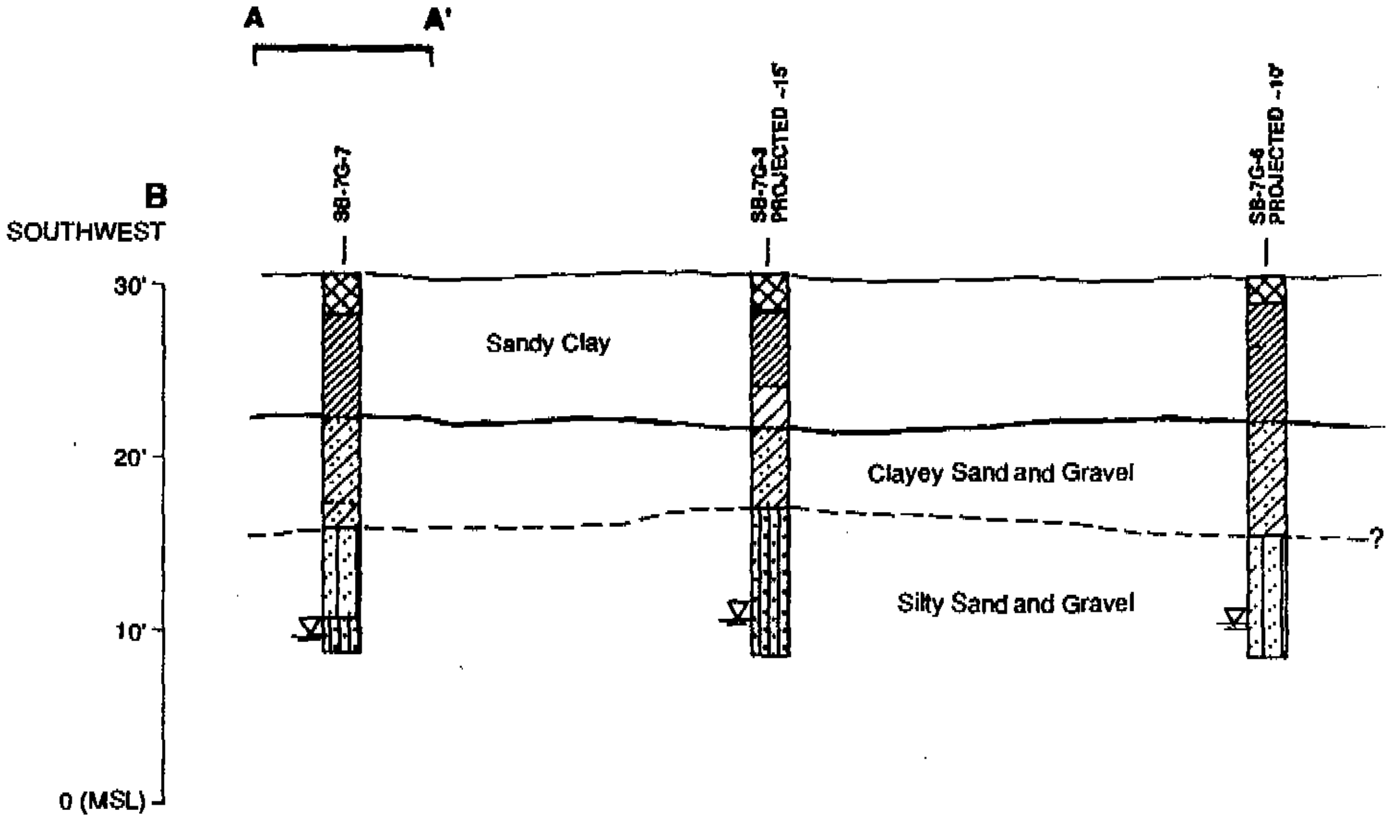

SB-7G-3
SB-7G-8
PROJECTED ~20'
Sandy Clay
Sandy Clay
Clayey Sand and Gravel
Silty Sand and Gravel
Silty Sand
and Gravel



C C
SB-7F-7
PROJECTED ~ 35'
SB-7F-8
PROJECTED ~ 10'
Sandy Clay
Clayey Sand and Gravel
Silty Sand and Gravel
UNIT
UNIT

FIGURE 11
GENERALIZED GEOLOGIC
CROSS SECTION A-A'




A
A'
B
SOUTHWEST
SB-7G-7
SB-7G-3
PROJECTED ~15'
SB-7G-6
PROJECTED ~10'
30'
20'
10'
0 (MSL)
Sandy Clay
Clayey Sand and Gravel
Silty Sand and Gravel
?

McLaren

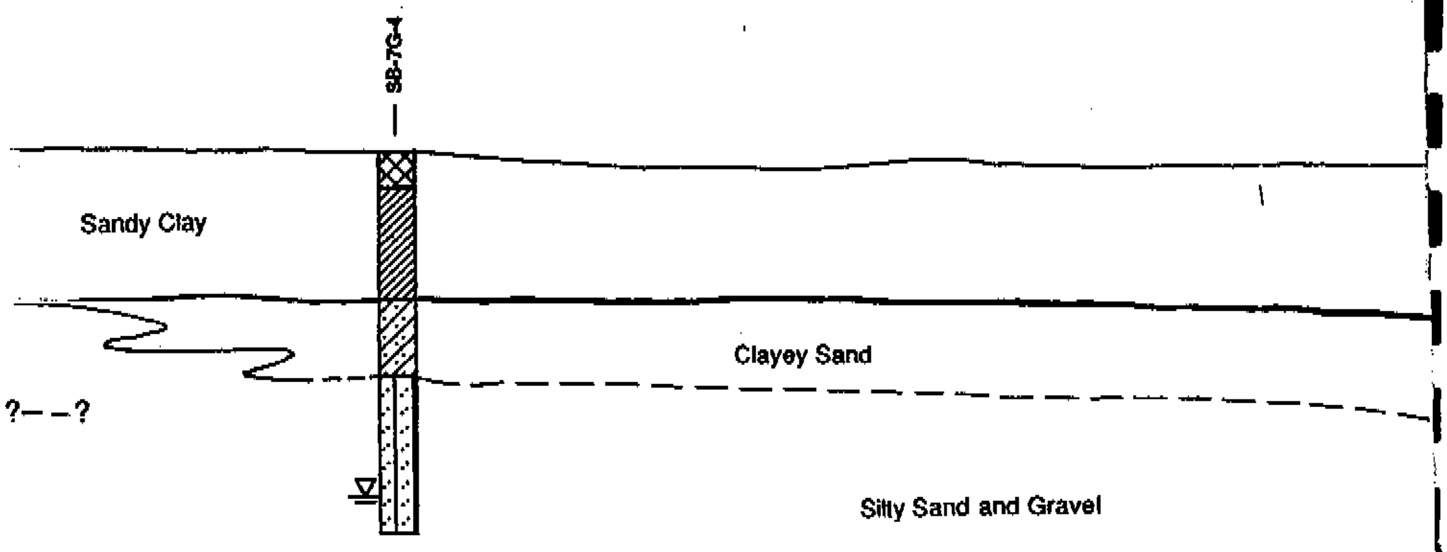
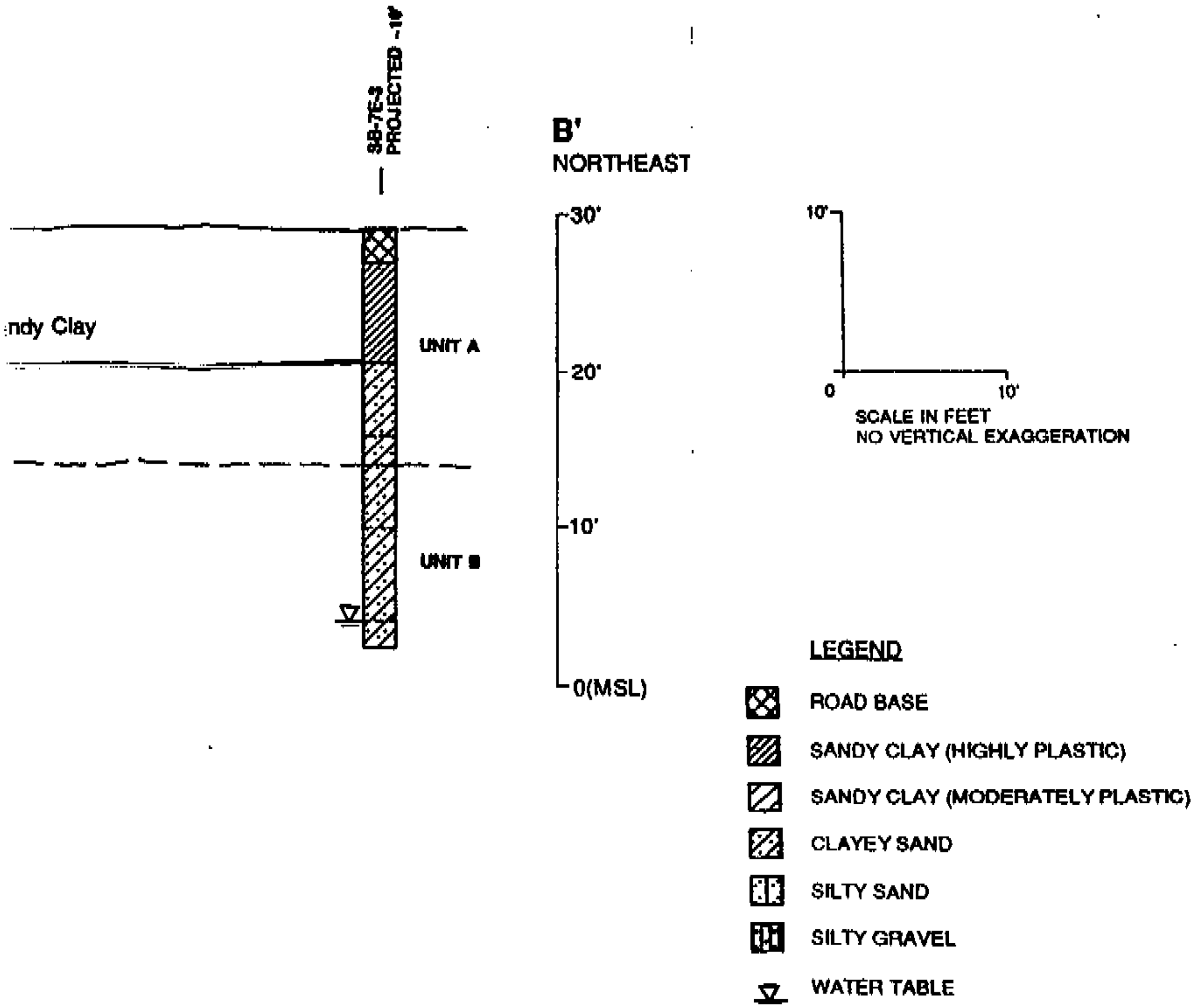
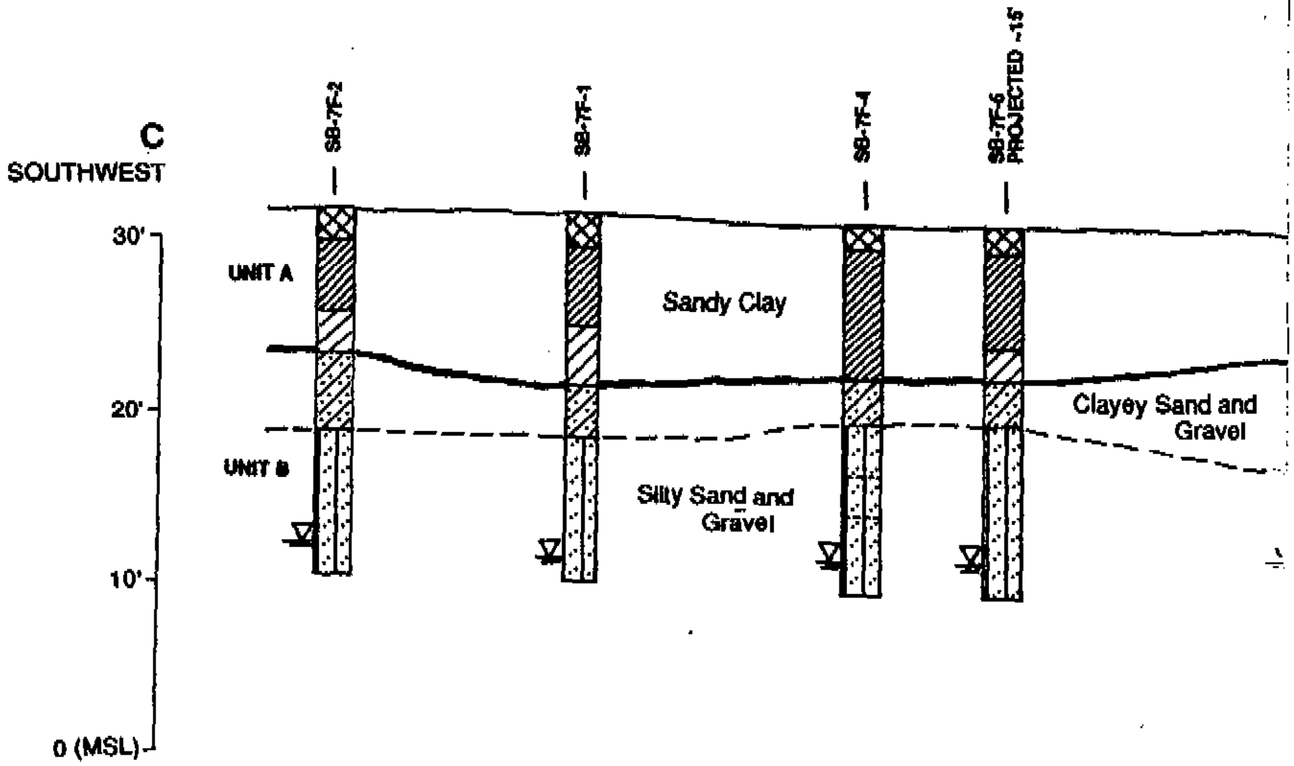
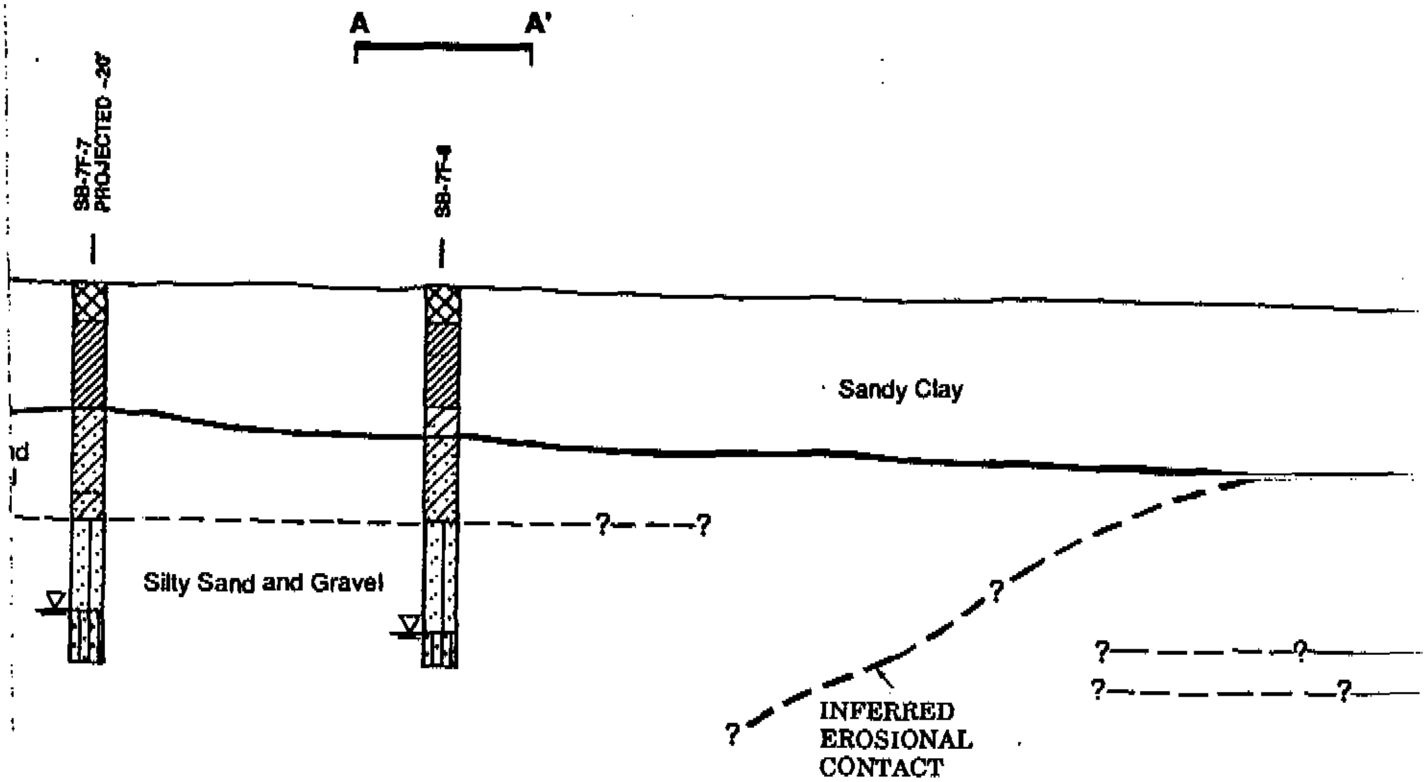

SB-7G-4
Sandy Clay
Clayey Sand
?– –?
Silty Sand and Gravel

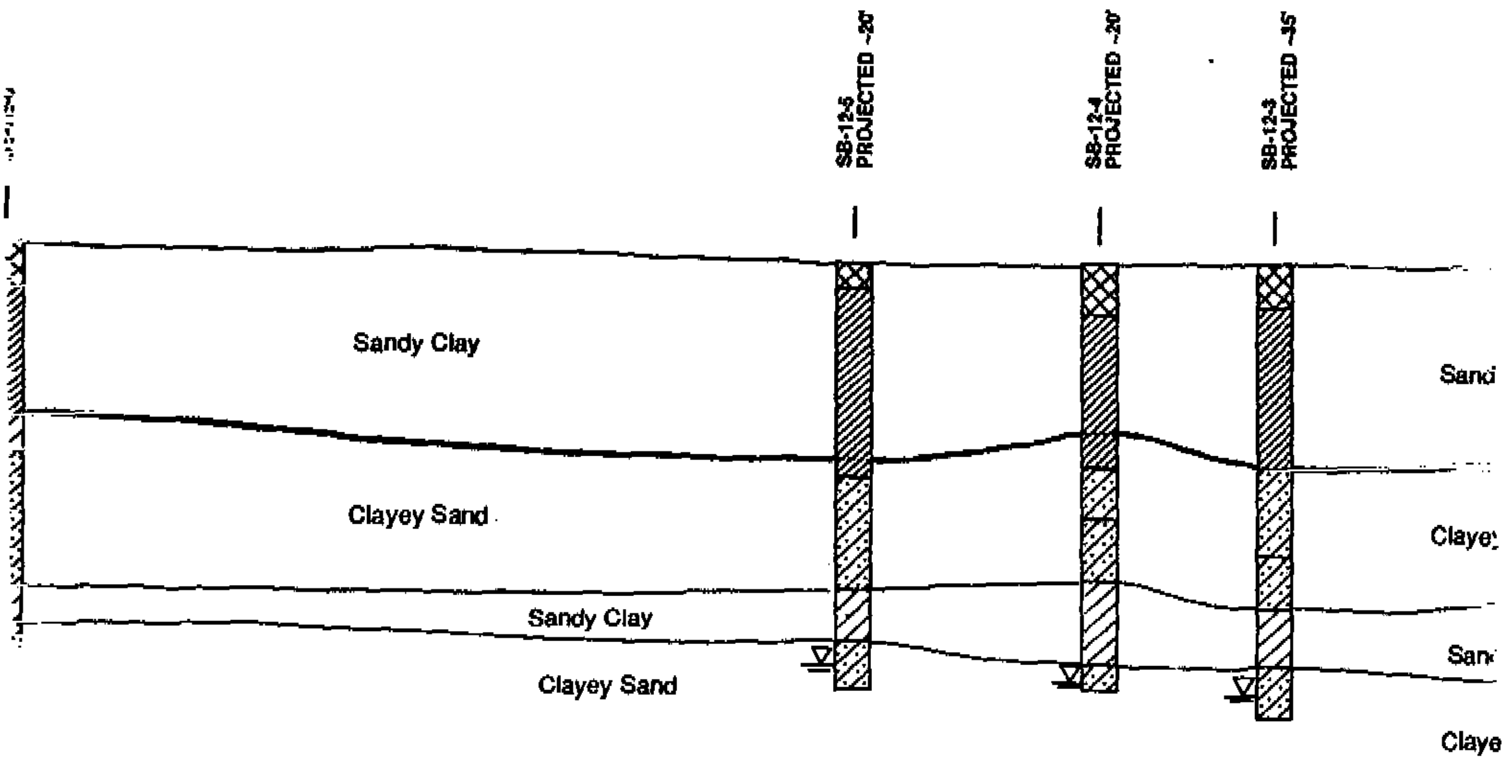
FIGURE 12
GENERALIZED GEOLOGIC
CROSS SECTION B-B'





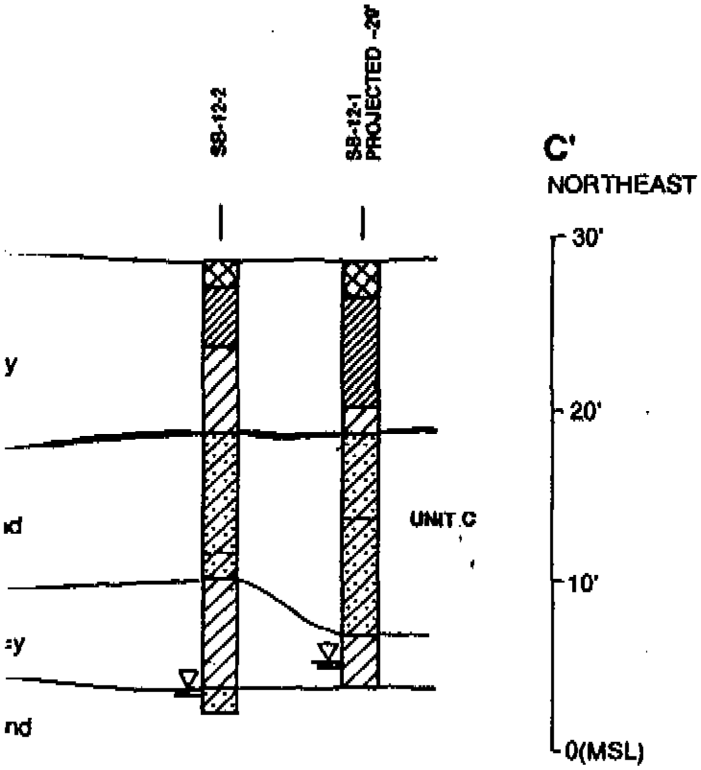
C
SOUTHWEST
SB-7F-2
SB-7F-1
SB-7F-4
SB-7F-6
PROJECTED ~15'
30'
20'
10'
0 (MSL)
UNIT A
UNIT B
Sandy Clay
Clayey Sand and Gravel
Silty Sand and Gravel

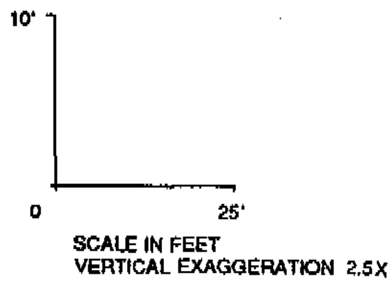

A
A'
SB-7F-7
PROJECTED ~20'
SB-7F-8
Sandy Clay
Silty Sand and Gravel
INFERRED
EROSIONAL
CONTACT



SB-12-5
PROJECTED ~20'
SB-12-4
PROJECTED ~20'
SB-12-3
PROJECTED ~35'
Sandy Clay
Clayey Sand
Sandy Clay
Clayey Sand

FIGURE 13
GENERALIZED GEOLOGIC
CROSS SECTION C-C'





LEGEND

- ROAD BASE
- SANDY CLAY (HIGHLY PLASTIC)
- SANDY CLAY (MODERATELY PLASTIC)
- CLAYEY SAND
- SILTY SAND
- SILTY GRAVEL
- WATER TABLE

clasts. The color of these sands vary from brown and yellowish brown to pale olive. This unit can be subdivided into (1) a clayey sand and gravel sub-unit and (2) a silty sand and gravel sub-unit, as shown by the dashed line on the cross-sections. The upper clayey sand and gravel sub-unit has low plastic fines while the lower silty sand and gravel sub-unit is non-plastic. Unit B is encountered at depths ranging from seven to sixteen feet and extends to a depth of at least 26.5 feet, the maximum depth of the soil borings. The first water bearing zone is encountered in Unit B at depths ranging from 19.5 to 25.0 feet.

In some borings a localized and discontinuous coarse grained sand unit is present at the top of Unit B. The unit is distinguished by low plastic fines and the absence of gravel. This yellowish brown unit is defined as a clayey sand by the USCS. As shown on Cross-Section B-B', the clayey sand layer is present in two of the five borings on this section and varies in thickness between 4.5 and 6.5 feet.

Interbedded Clayey Sand and Sandy Clay (Unit C)

In the eastern corner of the site near Building 12, Unit A is underlain by interbedded clayey sand and sandy clay. This unit is referred to as Unit C. As shown on cross-section C-C', Unit C is inferred to be in erosional contact with Unit B. The erosional contact occurs between Borings SB-7F-8 and SB-7E-6. The unit is subdivided based on variable percentages of included fine sand and the presence of calcium carbonate concretions. The first sub-unit is defined as a clayey sand. Calcium carbonate concretions were encountered in the upper portion of this sub-unit. The second sub-unit is a sandy clay of moderate plasticity. Calcium carbonate concretions were encountered in this sub-unit. The third sub-unit is a clayey sand. Groundwater was encountered at depths ranging from 23.5 to 25.0 feet.

The geologic materials encountered beneath Buildings 7A, 7B, and 7D consist of Unit A and B and are similar to materials described in cross-sections A-A', B-B' and the western end of cross-section C-C'. The materials encountered beneath Buildings 7C and 12 consist of Unit A and C and are similar to the eastern end of cross-section C-C'.

SOIL ANALYTICAL RESULTS

Soil analytical data obtained from soil borings drilled during the source area identification investigation are presented in this section of the report. Soil samples collected during the investigation were submitted for laboratory analysis as indicated in Table 1. Soil analytical data are presented on Tables 2 through 5. Analytical data sheets for VOC, metals, pH, petroleum hydrocarbon, polychlorinated biphenyl, pesticide analyses, method blanks for all analyses, laboratory cover letters, and chain of custody records are presented in Appendix C. Surrogate recovery data for EPA Method 8240 analysis, and dilution factors and detection limits for all soil analyses are shown on the laboratory data sheets.

TABLE 2

SUMMARY OF SOIL VOLATILE ORGANIC COMPOUND ANALYSES
(EPA METHOD 8240 AND EPA METHOD 8020)

Boring Designation[1]	Sample Depth (feet)	Compound (ug/kg-ppb) TCE	PCE	1,1-DCE	1,2-DCE	Toluene	Acetone	Methylene Chloride
Building 7A								
HA-7A-1-1	0.5 - 1.0	"-"	-	-	-	-	-	36*
	9.0 - 9.5	-	-	-	-	-	-	28*
HA-7A-1-2	1.0 - 1.5	-	-	-	-	-	33*	27*
	6.0 - 6.5	-	-	-	-	-	-	-
HA-7A-3-1	1.0 - 1.5	-	-	-	-	43	-	29*
	6.0 - 6.5	-	-	-	-	28	-	25*
HA-7A-5-1	1.5 - 2.0	-	-	-	-	-	34*	39*
	9.0 - 9.5	-	-	-	-	-	30*	29*
HA-7A-5-2	1.5 - 2.0	-	-	-	-	7	27*	35*
	8.5 - 9.0	-	-	-	-	-	-	28*
HA-7A-6-1	1.5 - 2.0	-	-	-	-	7	-	-
	6.5 - 7.0	-	-	-	-	-	-	-
HA-7A-6-2	2.0 - 2.5	-	-	-	-	7	-	-
	9.0 - 9.5	-	-	-	-	-	-	-
HA-7A-6-3	1.0 - 1.5	-	-	-	-	14	-	-
	9.0 - 9.5	-	-	-	-	-	25*	-

1 HA indicates hand auger boring; SB indicates auger rig boring.
"-" Means below reporting limit.
* Suspected method blank contamination.

0307ADG4.TBL

TABLE 2

SUMMARY OF SOIL VOLATILE ORGANIC COMPOUND ANALYSES
(EPA METHOD 8240 AND EPA METHOD 8020)
(continued)

Boring Designation[1]	Sample Depth (feet)	Compound (ug/kg-ppb) TCE	PCE	1,1-DCE	1,2-DCE	Toluene	Acetone	Methylene Chloride
Building 7A								
HA-7A-6-4	1.5 - 2.0	"-"	-	-	-	-	-	-
	6.5 - 7.0	-	-	-	-	-	27*	-
Building 7B								
HA-7B-1A-1	1.5 - 2.0	-	-	-	8	20	-	-
	9.0 - 9.5	-	-	-	-	-	-	31*
HA-7B-3-1	1.5 - 2.0[2]	64	-	-	16	48	92*	29*
	9.0 - 9.5	-	-	-	-	-	-	26*
HA-7B-3-2	2.0 - 2.5	-	-	-	-	-	43*	25*
	9.0 - 9.5	-	-	-	-	-	-	-
HA-7B-4-1	2.0 - 2.5	31	-	-	-	-	-	34*
	9.0 - 9.5	-	-	-	-	-	-	-
HA-7B-4-2	2.5 - 3.0	15	-	-	-	-	27*	30*
	7.5 - 8.0	-	-	-	-	-	-	-
HA-7B-6-1	2.5 - 3.0	-	-	-	-	-	-	-
	7.5 - 8.0	-	-	-	-	-	-	-
HA-7B-7-1	2.0 - 2.5	-	-	-	-	11	-	-
	9.0 - 9.5	-	-	-	-	-	-	-

1 HA indicates hand auger boring; SB indicates auger rig boring.
2 2-Butanone also detected at a concentration of 50 ppb.
"-" Means below reporting limit.
* Suspected method blank contamination.
0307ADG4.TBL

TABLE 2

SUMMARY OF SOIL VOLATILE ORGANIC COMPOUND ANALYSES
(EPA METHOD 8240 AND EPA METHOD 8020)
(continued)

Boring Designation[1]	Sample Depth (feet)	Compound (ug/kg-ppb) TCE	PCE	1,1-DCE	1,2-DCE	Toluene	Acetone	Methylene Chloride
Building 7B								
HA-7B-7-2	1.0 - 1.5	"-"	-	-	-	-	-	-
	9.0 - 9.5	-	-	-	-	-	-	-
HA-7B-7-3	1.5 - 2.0	5	-	-	-	-	-	30*
	6.5 - 7.0	-	-	-	-	-	-	35*
HA-7B-8-1	2.5 - 3.0	-	-	-	-	10	-	-
	7.5 - 8.0	-	-	-	-	-	-	-
Building 7C								
HA-7C-1-1	2.5 - 3.0	-	-	-	-	-	-	-
	9.0 - 9.5	-	-	-	-	-	-	-
HA-7C-2-1	3.0 - 3.5	-	-	-	-	-	-	-
HA-7C-2-2	4.0 - 4.5	-	-	-	-	5	-	-
	9.0 - 9.5	-	-	-	-	5	-	-
HA-7C-2-3	3.5 - 4.0	-	-	-	-	-	40*	30*
	9.0 - 9.5	-	-	-	-	-	-	-
HA-7C-2-4	4.0 - 4.5	-	-	-	-	-	29*	-
	9.0 - 9.5	-	-	-	-	-	-	-

1 HA indicates hand auger boring; SB indicates auger rig boring.
"-" Means below reporting limit.
* Suspected method blank contamination.

0307ADG4.TBL

TABLE 2

SUMMARY OF SOIL VOLATILE ORGANIC COMPOUND ANALYSES
(EPA METHOD 8240 AND EPA METHOD 8020)
(continued)

Boring Designation[1]	Sample Depth (feet)	Compound (ug/kg-ppb)						
		TCE	PCE	1,1-DCE	1,2-DCE	Toluene	Acetone	Methylene Chloride
Building 7C								
HA-7C-4-1	1.0 - 1.5	"-"	-	-	-	56	-	-
	6.0 - 6.5	-	-	-	-	46	27*	-
HA-7C-4-2	6.0 - 6.5	-	-	-	-	-	-	-
	9.0 - 9.5	-	-	-	-	-	49*	-
Building 7D								
HA-7D-1A-1	1.5 - 2.0	510	1,300	66	-	-	-	-
	6.5 - 7.0	-	-	-	-	-	-	-
HA-7D-1A-2	1.5 - 2.0	610	1,600	80	-	-	-	-
	6.5 - 7.0	56	130	-	-	-	-	-
HA-7D-1A-3	1.0 - 1.5	36	60	-	5	-	-	-
	9.0 - 9.5	-	11	-	-	-	-	-
HA-7D-1A-4	1.0 - 1.5[2]	5,700	42,000	-	-	17,000	-	-
	8.0 - 8.5	7	8	-	5	10	-	31*
HA-7D-1B-1	1.0 - 1.5	-	113	-	-	-	-	-
	9.0 - 9.5	68	52	-	-	-	-	-

1 HA indicates hand auger boring; SB indicates auger rig boring.
2 Total Xylenes also detected at a concentration of 1,400 ppb.
"-" Means below reporting limit.
* Suspected method blank contamination.
0307ADG4.TBL

TABLE 2

SUMMARY OF SOIL VOLATILE ORGANIC COMPOUND ANALYSES
(EPA METHOD 8240 AND EPA METHOD 8020)
(continued)

Boring Designation[1]	Sample Depth (feet)	Compound (ug/kg-ppb)						
		TCE	PCE	1,1-DCE	1,2-DCE	Toluene	Acetone	Methylene Chloride
Building 7D								
HA-7D-1B-2	1.0 - 1.5	5	15	6	"-"	-	27*	26*
	9.0 - 9.5	-	-	-	-	-	44*	30*
HA-7D-2-1	1.0 - 1.5	35	-	-	-	130	27	25
	9.0 - 9.5	-	-	-	-	40	-	-
HA-7D-3-1	1.0 - 1.5	73	-	-	-	-	-	-
	8.5 - 9.0	110	91	-	-	-	-	-
HA-7D-3-2	1.5 - 2.0	75	-	-	-	-	-	-
	9.0 - 9.5	-	62	-	-	-	-	-
HA-7D-3-4	1.0 - 1.5	200	-	-	-	76	-	-
	9.0 - 9.5	300	-	-	-	-	-	-
Building 7E								
SB-7E-2	2.0 - 2.5	NA[2]	NA	NA	NA	44	NA	NA
	6.0 - 6.5	NA	NA	NA	NA	28	NA	NA
	11.0 - 11.5	NA	NA	NA	NA	2.1	NA	NA
	16.0 - 16.5	NA	NA	NA	NA	-	NA	NA

1 HA indicates hand auger boring; SB indicates auger rig boring.
2 This compound analyzed using Method 8020.
"-" Means below reporting limit.
* Suspected method blank contamination.
0307ADG4.TBL

TABLE 2

SUMMARY OF SOIL VOLATILE ORGANIC COMPOUND ANALYSES
(EPA METHOD 8240 AND EPA METHOD 8020)
(continued)

Boring Designation[1]	Sample Depth (feet)	Compound (ug/kg-ppb)						
		TCE	PCE	1,1-DCE	1,2-DCE	Toluene	Acetone	Methylene Chloride
Building 7E								
SB-7E-4	6.0 - 6.5	58	"-"	-	32	-	-	-
	11.0 - 11.5	-	-	-	-	-	-	-
	16.0 - 16.5	-	-	-	-	-	-	-
SB-7E-5	6.0 - 6.5	7	-	-	-	-	-	-
	11.0 - 11.5	-	-	-	-	-	-	-
	16.0 - 16.5	-	-	-	-	-	-	-
	21.0 - 21.5	-	-	-	-	-	-	-
SB-7E-6	2.5 - 3.0	94	-	-	14	-	25*	-
	6.0 - 6.5	36	-	-	8	-	-	-
	11.0 - 11.5	-	-	-	-	-	-	-
	16.0 - 16.5	-	-	-	-	-	-	-
	22.0 - 22.5[2]	-	-	-	-	-	-	-
Building 7F								
SB-7F-1	6.0 - 6.5	NA[3]	NA	NA	NA	-	NA	NA
	11.0 - 11.5	NA	NA	NA	NA	-	NA	NA
	16.0 - 16.5	NA	NA	NA	NA	-	NA	NA

1 HA indicates hand auger boring; SB indicates auger rig boring.
2 Saturated soil sample.
3 This compound analyzed using Method 8020.
"-" Means below reporting limit.
* Suspected method blank contamination.
0307ADG4.TBL

TABLE 2

SUMMARY OF SOIL VOLATILE ORGANIC COMPOUND ANALYSES
(EPA METHOD 8240 AND EPA METHOD 8020)
(continued)

Boring Designation[1]	Sample Depth (feet)	Compound (ug/kg-ppb) TCE	PCE	1,1-DCE	1,2-DCE	Toluene	Acetone	Methylene Chloride
Building 7F								
SB-7F-2	6.0 - 6.5	"-"	-	-	-	-	-	31*
	11.0 - 11.5	-	-	-	-	8	-	-
	16.0 - 16.5	-	-	-	-	20	-	30*
SB-7F-3	6.0 - 6.5	NA[2]	NA	NA	NA	-	NA	NA
	11.0 - 11.5	NA	NA	NA	NA	2.5	NA	NA
	16.0 - 16.5	NA	NA	NA	NA	2.1	NA	NA
SB-7F-4	6.0 - 6.5	-	-	-	-	9*	-	-
	11.0 - 11.5	-	-	-	-	13*	-	-
	16.0 - 16.5	-	-	-	-	8*	-	-
SB-7F-5	6.0 - 6.5	NA	NA	NA	NA	5.3	NA	NA
	11.0 - 11.5	NA	NA	NA	NA	6.5	NA	NA
	16.0 - 16.5	NA	NA	NA	NA	27	NA	NA
SB-7F-6	6.0 - 6.5	NA	NA	NA	NA	12	NA	NA
	11.0 - 11.5	NA	NA	NA	NA	-	NA	NA
	16.0 - 16.5	NA	NA	NA	NA	21	NA	NA

1 HA indicates hand auger boring; SB indicates auger rig boring.
2 This compound analyzed using Method 8020.
"-" Means below reporting limit.
* Suspected method blank contamination.
0307ADG4.TBL

TABLE 2

SUMMARY OF SOIL VOLATILE ORGANIC COMPOUND ANALYSES
(EPA METHOD 8240 AND EPA METHOD 8020)
(continued)

Boring Designation[1]	Sample Depth (feet)	Compound (ug/kg-ppb)						
		TCE	PCE	1,1-DCE	1,2-DCE	Toluene	Acetone	Methylene Chloride
Building 7F								
SB-7F-7	6.0 - 6.5	"-"	-	-	-	-	-	31*
	11.0 - 11.5	-	-	-	-	-	-	-
	16.0 - 16.5	-	-	-	-	34	-	54*
	21.0 - 21.5[2]	10	-	-	-	-	-	47*
SB-7F-8	2.0 - 2.5[3]	860	5	-	86	6	-	900
	6.0 - 6.5	8	-	-	-	-	-	-
	11.0 - 11.5	-	-	-	-	-	-	-
	16.0 - 16.5	28	-	-	-	-	-	-
	21.0 - 21.5[3]	-	-	-	-	-	-	-
Building 7G								
SB-7G-2	6.0 - 6.5	-	-	-	-	-	-	-
	11.0 - 11.5	-	-	-	-	-	-	-
	16.0 - 16.5	-	-	-	-	7	-	-
SB-7G-3	6.0 - 6.5	-	-	-	-	13	-	-
	11.0 - 11.5	-	-	-	-	-	-	41*
	16.0 - 16.5	-	-	-	-	6	-	26*
	21.0 - 21.5[3]	5	-	-	-	-	-	41*

1 HA indicates hand auger boring; SB indicates auger rig boring.
2 Saturated soil sample.
3 This sample also contained 5 ppb total xylenes.
"-" Means below reporting limit.
* Suspected method blank contamination.
0307ADG4.TBL

TABLE 2

SUMMARY OF SOIL VOLATILE ORGANIC COMPOUND ANALYSES
(EPA METHOD 8240 AND EPA METHOD 8020)
(continued)

Boring Designation[1]	Sample Depth (feet)	Compound (ug/kg-ppb) TCE	PCE	1,1-DCE	1,2-DCE	Toluene	Acetone	Methylene Chloride
Building 7G								
SB-7G-4	6.0 - 6.5	25	"-"	-	-	-	-	-
	11.0 - 11.5	-	-	-	-	-	-	-
	16.0 - 16.5	7	-	-	-	10	-	-
SB-7G-5	6.0 - 6.5	18	-	-	6	-	-	-
	11.0 - 11.5	-	-	-	-	-	-	-
	16.0 - 16.5	10	-	-	-	-	-	-
	21.0 - 21.5	NA[2]	NA	NA	NA	2.5	NA	NA
SB-7G-6	6.0 - 6.5	NA	NA	NA	NA	4.9	NA	NA
	11.0 - 11.5	NA	NA	NA	NA	2.1	NA	NA
	16.0 - 16.5	NA	NA	NA	NA	19	NA	NA
SB-7G-7	6.0 - 6.5	5	-	-	-	-	54*	39
	11.0 - 11.5	-	-	-	-	-	-	-
	16.0 - 16.5	-	-	-	-	-	99*	34
	21.0 - 21.5[3]	-	-	-	-	-	49*	34
SB-7G-8	6.0 - 6.5	-	-	-	-	18	-	-
	11.0 - 11.5	-	-	-	-	-	-	36
	16.0 - 16.5	-	-	-	-	-	-	40
	21.0 - 21.5[4]	6	-	-	-	-	59[5]	36

1 HA indicates hand auger boring; SB indicates auger rig boring.
2 This compound analyzed using Method 8020.
3 Saturated soil sample.
"-" Means below reporting limit.
* Suspected method blank contamination.
0307ADG4.TBL

TABLE 2

SUMMARY OF SOIL VOLATILE ORGANIC COMPOUND ANALYSES
(EPA METHOD 8240 AND EPA METHOD 8020)
(continued)

Boring Designation[1]	Sample Depth (feet)	Compound (ug/kg-ppb)						
		TCE	PCE	1,1-DCE	1,2-DCE	Toluene	Acetone	Methylene Chloride
Building 12								
HA-12U-3-1	4.0 - 4.5	"-"	-	-	-	-	31*	-
	9.0 - 9.5	-	-	-	-	-	-	-
HA-12U-9-1	4.5 - 5.0	-	3600	-	-	-	-	-
	9.5 - 10.0	18	130	-	25	-	32*	30*
SB-12-1	6.0 - 6.5	16	64	-	-	100	-	-
	11.0 - 11.5	-	6	-	-	23	-	28*
	21.0 - 21.5	-	39	-	-	110	-	35*
	24.0 - 24.5[2]	5	190	-	-	23	-	32
SB-12-2	6.0 - 6.5	23	470	5	-	36	-	-
	16.0 - 16.5	53	-	-	-	43	-	30*
	25.5 - 26.0[2]	9	8	-	-	8	-	25*
SB-12-3	6.0 - 6.5	-	-	-	-	85	28	-
	11.0 - 11.5	-	-	-	-	34	-	-
	21.0 - 21.5	-	-	-	-	20	26	-
	26.0 - 26.5[2]	-	-	-	-	33	25*	-

1 HA indicates hand auger boring; SB indicates auger rig boring.
2 Saturated soil sample.
"-" Means below reporting limit.
* Suspected method blank contamination.
0307ADG4.TBL

TABLE 2

SUMMARY OF SOIL VOLATILE ORGANIC COMPOUND ANALYSES
(EPA METHOD 8240 AND EPA EMTHOD 8020)
(continued)

Boring Designation[1]	Sample Depth (feet)	Compound (ug/kg-ppb) TCE	PCE	1,1-DCE	1,2-DCE	Toluene	Acetone	Methylene Chloride
Building 12								
SB-12-4	6.0 - 6.5	"-"	-	-	-	61	-	35
	11.0 - 11.5	-	-	-	-	-	-	-
	21.0 - 21.5	-	-	-	-	42	27	26
	24.0 - 24.5	-	-	-	-	98	-	29*
SB-12-5	11.0 - 11.5	-	-	-	-	28	31	-
	21.0 - 21.5	-	-	-	-	110	38*	28*
SB-12-6	11.0 - 11.5	-	-	-	-	15	36*	32*
	21.0 - 21.5	-	-	-	-	130	28*	25*
	24.0 - 24.5[2]	14	9	-	-	81	25*	-
Chemical Storage Building								
SB-CS-1	6.0 - 6.5	-	-	-	-	-	-	-
	11.0 - 11.5	-	-	-	-	-	-	56*
	16.0 - 16.5	-	-	-	-	5	-	-
SB-CS-2	7.78 - 8.13	NA[3]	NA	NA	NA	NA	NA	NA
	14.50 - 14.85	-	-	-	-	-	-	-
	18.38 - 18.74	-	-	-	-	-	-	-
	20.51 - 20.86[2]	-	-	-	-	40	-	-
SB-CS-3	7.78 - 8.13	8	-	-	-	14	-	36
	14.85 - 14.83	5	-	-	-	20	-	31
	18.38 - 18.74	-	-	-	-	5	57	41

1 HA indicates hand auger boring; SB indicates auger rig boring.
"-" Means below reporting limit.
2 Saturated soil sample.
3 Sample broken during shipment.
0307ADG4.TBL

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)-------- MA-7A-1-1 0.5	9.0	MA-7A-1-2 1.0	6.0	MA-7A-3-1 2.0	7.0
Aluminum	NA[4]	NA	.20	10,000-300,000	71,000	22	9.5	16	7.7	13	11
Arsenic	5.0	500	.01 / .2	1-50	5	.01	.01	*-*	.01	-	.02
Antimony	15	500	.05 / .2	NA	NA	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	4.2	5.3	6.0	4.5	6.5	6.2
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	.01	-	-	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.04	.04	.04	.03	.06	.04
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	-	.22	.77	.23	.60	.27
Copper	25	2,500	.05	2-100	30	.69	.38	.32	.29	.22	.14
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01 / .2	2-200	10	-	-	.01	-	-	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-
Nickel	20	2,000	.05 / .10	5-500	40	.09	.47	3.2	.42	1.8	.51
Selenium	1.0	100	.05 / .2	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01 / .2	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.06	.24	.24	.34	.28	.50
Zinc	250	5,000	.05	10-300	50	.29	.25	.38	.21	.10	.07
pH						7.8	8.8	6.3	8.4	6.8	8.4

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Not Available
"-" Means Below Reporting Limit

0307ADG3

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)-------- NA-7A-4-1 2.0	NA-7A-4-1 7.0	NA-7A-4-2 2.0	NA-7A-4-3 1.5	NA-7A-4-3 6.5
Aluminum	NA[4]	NA	.20	10,000-300,000	71,000	15	11	15	14	9.2
Arsenic	5.0	500	.01	1-50	5	*-*	.01	-	-	.02
Antimony	15	500	.05	NA	NA	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	7.1	6.9	7.1	7.1	8.0
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	-	-	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.06	.05	.06	.06	.04
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.69	.37	.70	.70	.16
Copper	25	2,500	.05	2-100	30	.24	.15	.21	.22	.13
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	.01	.01	-	.02	.01
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	2.0	.61	1.6	2.1	.21
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.30	.38	.39	.31	.26
Zinc	250	5,000	.05	10-300	50	.19	.11	.11	.16	.10
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pH						7.0	8.9	7.1	7.1	8.6

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Not Available
- Means Below Reporting Limit

0307ADG3

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)-------- MA-7A-5-1 1.5	9.0	MA-7A-5-2 1.0	8.5	MA-7A-6-1 1.5	6.5
Aluminum	NA[4]	NA	.20	10,000-300,000	71,000	9.5	16	16	10	17	9.4
Arsenic	5.0	500	.01	1-50	5	"-"	-	.01	-	-	-
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	4.4	4.7	4.4	5.9	6.6	6.6
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	.04	-	-	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.06	.04	.09	.04	.10	.04
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.72	.16	.70	.24	.74	.30
Copper	25	2,500	.05	2-100	30	.33	.21	.31	.18	.47	.10
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	.03	-	.01	-	.72	.02
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	2.3	.42	1.7	.34	2.2	.40
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.52	.18	.48	.27	.30	.36
Zinc	250	5,000	.05	10-300	50	.25	.12	.12	.14	.35	.08
pH						7.2	8.6	7.2	8.4	6.5	9.0

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Not Available
"-" Means Below Reporting Limit

0307ADG3

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)-------- MA-7A-6-2 2.0	MA-7A-6-2 9.0	MA-7A-6-3 1.0	MA-7A-6-3 9.0	MA-7A-6-4 1.5	MA-7A-6-4 6.5
Aluminum	NA[4]	NA	.20	10,000-300,000	71,000	18	10	17	14	19	15
Arsenic	5.0	500	.01	1-50	5	"-"	-	-	.03	-	.02
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	7.0	6.0	6.8	6.2	7.6	7.8
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	-	-	-	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.06	.05	.08	.04	.13	.09
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.88	.27	.69	.61	.69	.27
Copper	25	2,500	.05	2-100	30	.40	.24	.23	.72	.39	.28
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	.01	-	.02	-	.03	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	.07	-	-
Nickel	20	2,000	.05	5-500	40	2.2	.36	2.2	.65	2.2	.39
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.36	.23	.30	.32	.34	.38
Zinc	250	5,000	.05	10-300	50	.19	.31	.25	.38	.55	.15
pH						7.2	9.0	6.4	9.2	6.5	8.6

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Not Available
"-" Means Below Reporting Limit

0307AD03

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)-------- HA-7B-1A-1 1.5	HA-7B-1A-1 9.0	HA-7B-2-2 1.0	HA-7B-2-2 8.0	HA-7B-3-1 1.5	HA-7B-3-1 9.0
Aluminum	NA[4]	NA	.20	10,000-300,000	71,000	16	9.4	6.8	11	20	9.7
Arsenic	5.0	500	.01	1-50	5	-	-	-	.03	.07	-
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	7.0	6.2	3.9	9.4	7.5	5.6
Beryllium	0.75	75	.01	0.1-40	6	.01	-	-	-	.01	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	-	-	.01	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.38	.05	.03	.07	.28	.04
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.54	.13	.21	.47	.68	.27
Copper	25	2,500	.05	2-100	30	.47	.67	.74	.57	.52	.57
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	-	-	-	.01	.35	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	2.0	.27	.16	.81	2.1	.66
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	1.1	.34	-	.61	1.3	.28
Zinc	250	5,000	.05	10-300	50	.75	.39	.31	.38	.64	.32
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pH						8.1	8.7	8.6	8.8	8.2	8.7

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Not Available
"-" Means Below Reporting Limit

0307ADG3

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)-------- MA-7B-3-2 2.0	9.0	MA-7B-4-1 2.0	9.0	MA-7B-4-2 2.5	7.5
Aluminum	NA[4]	NA	.20	10,000-300,000	71,000	13	11	16	11	18	11
Arsenic	5.0	500	.01	1-50	5	.30	.01	.01	.02	.02	.02
Antimony	15	500	.05	NA	NA	*-*	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	4.5	6.7	5.3	6.0	6.5	6.7
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	-	-	-	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.06	.04	.11	.06	.13	.06
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.60	.27	.77	.17	.74	.12
Copper	25	2,500	.05	2-100	30	.45	.34	.24	.48	.35	.27
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	-	-	.09	-	.23	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	1.2	.41	2.2	.25	2.1	.21
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.55	.31	.40	.30	.49	.28
Zinc	250	5,000	.05	10-300	50	.56	.21	.76	.34	1.4	.26
pH						7.8	8.8	6.7	9.0	7.1	8.8

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Not Available
- Means Below Reporting Limit

0307ADG3

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)--------					
						MA-7B-6-1		MA-7B-7-1		MA-7B-7-2	
						2.5	7.5	2.0	9.0	1.0	9.0
Aluminum	NA[4]	NA	.20	10,000-300,000	71,000	14	13	18	9.6	16	12
Arsenic	5.0	500	.01	1-50	5	.01	.01	-	-	-	.02
Antimony	15	500	.05	NA	NA	"-"	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	6.3	8.2	4.4	8.1	1.4	5.4
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	-	-	-	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.08	.03	.09	.04	.07	.07
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.59	.26	.64	.24	.33	.24
Copper	25	2,500	.05	2-100	30	.23	.14	.36	.17	.53	.25
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	.07	-	.02	-	-	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	1.7	.44	1.8	.32	.35	.45
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.41	.22	.47	.28	.28	.30
Zinc	250	5,000	.05	10-300	50	.47	.09	.22	.12	.31	.16
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pH						NR[5]	8.8	9.2	8.7	7.8	8.5

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Not Available
5 Not reported due to insufficient sample quantity for analysis.
"-" Means Below Reporting Limit

0307AD63

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)-------- MA-7B-7-3 1.5	6.5	MA-7B-8-1 2.5	7.5	MA-7C-1-1 2.5	9.0
Aluminum	NA[4]	NA	.20	10,000-300,000	71,000	25	9.3	14	11	16	8.7
Arsenic	5.0	500	.01	1-50	5	.06	.01	*-*	.02	.06	.02
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	7.4	5.9	6.1	6.4	6.6	5.6
Beryllium	0.75	75	.01	0.1-40	6	.01	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	-	-	-	.01	-
Chromium (total)	560	2,500	.02	1-1,000	100	.36	.05	.07	.08	.34	.04
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.52	.29	.68	.33	.58	.43
Copper	25	2,500	.05	2-100	30	-	.16	.28	.18	.39	.24
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	.04	.01	.01	-	.23	.02
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	1.8	.55	2.3	.53	1.7	.87
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	1.1	.37	.28	.39	.76	.49
Zinc	250	5,000	.05	10-300	50	.28	.11	.17	.11	2.8	.24
pH						8.4	9.0	6.6	8.4	7.0	8.6

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Not Available
- Means Below Reporting Limit

0307ADG3

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)-------- MA-7C-2-1 3.0	MA-7C-2-2 4.0	MA-7C-2-2 9.0	MA-7C-2-3 3.5	MA-7C-2-3 9.0
Aluminum	NA[4]	NA	.20	10,000-300,000	71,000	13	19	9.1	26	8.9
Arsenic	5.0	500	.01	1-50	5	.01	.02	.02	.05	.01
Antimony	15	500	.05	NA	NA	"-"	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	5.6	5.2	3.4	7.7	3.8
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	.01	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	-	-	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.15	.13	.06	.24	.04
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.54	.77	.57	.70	.37
Copper	25	2,500	.05	2-100	30	.71	.35	.29	.34	.25
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	.11	.01	.01	.04	.01
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	.09	-	-
Nickel	20	2,000	.05	5-500	40	1.1	2.1	1.2	2.2	1.0
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.38	.56	.61	1.2	.43
Zinc	250	5,000	.05	10-300	50	.54	.16	.14	.28	.26
pH						8.6	6.8	8.1	6.5	8.4

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Not Available
"-" Means Below Reporting Limit

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)-------- MA-7C-2-4 4.0	9.0	MA-7C-4-1 1.0	6.0	MA-7C-4-2 6.0	9.0
Aluminum	NA[4]	NA	.20	10,000-300,000	71,000	20	8.6	27	13	15	9.9
Arsenic	5.0	500	.01	1-50	5	*-*	-	.03	.02	-	-
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	5.9	4.2	6.6	7.2	6.5	6.5
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	-	-	-	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.10	.05	.13	.08	.10	.06
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.82	.74	.77	.22	.79	.13
Copper	25	2,500	.05	2-100	30	.27	.25	.24	.34	.30	1.5
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	-	.02	.01	-	.10	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	.05	-	-	-	-
Nickel	20	2,000	.05	5-500	40	2.0	1.4	2.4	.45	2.3	.25
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.64	.58	.69	.54	.57	.26
Zinc	250	5,000	.05	10-300	50	.15	.10	.12	.24	.70	.96
--------------											
pH						7.7	8.6	7.0	8.4	8.2	8.9

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Not Available
- Means Below Reporting Limit

0307AD63

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)-------- NA-7D-1A-1 1.5	NA-7D-1A-1 6.5	NA-7D-1A-2 1.5	NA-7D-1A-2 6.5	NA-7D-1A-3 1.0	NA-7D-1A-3 9.0
Aluminum	NA[4]	NA	.20	10,000-300,000	71,000	15	8.0	13	8.7	13	8.8
Arsenic	5.0	500	.01	1-50	5	.02	.01	.01	.01	.01	.01
Antimony	15	500	.05	NA	NA	"-"	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	6.3	5.9	6.0	5.3	6.6	5.9
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	-	.08	-	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.13	.05	.06	.05	.12	.04
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.75	.33	.80	.31	.44	.26
Copper	25	2,500	.05	2-100	30	.33	.19	.46	.33	.31	.22
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	-	-	-	-	.02	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	1.7	.77	4.6	.62	1.9	.35
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.61	.38	.42	.33	.51	.30
Zinc	250	5,000	.05	10-300	50	.18	.17	7.5	.87	.31	.15
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pH						7.0	8.4	6.6	8.3	6.7	8.3

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Not Available
"-" Means Below Reporting Limit

0307AD63

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)--------					
						MA-7D-1A-4		MA-7D-1B-1		MA-7D-1B-2	
						1.0	8.0	1.0	9.0	1.0	9.0
Aluminum	NA[4]	NA	.20	10,000-300,000	71,000	17	8.8	14	11	14	9.3
Arsenic	5.0	500	.01	1-50	5	.04	.01	.01	.01	"-"	-
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	8.5	8.6	7.1	7.0	6.9	4.6
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	.02	-	-	-	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.34	.05	.10	.05	.05	.04
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.32	.24	.59	.28	.61	.19
Copper	25	2,500	.05	2-100	30	.45	.27	.27	1.0	.33	.61
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	.04	-	.02	-	.01	.01
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	1.2	.37	1.5	.53	1.8	.30
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.68	.35	.50	.28	.33	.24
Zinc	250	5,000	.05	10-300	50	1.3	.10	.25	.45	.51	.72
pH						8.1	8.4	7.3	8.4	7.3	8.2

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Not Available
"-" Means Below Reporting Limit

0307AD63

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)-------- NA-7D-2-1 1.0	9.0	NA-7D-3-1 1.0	8.5	NA-7D-3-2 1.5	9.0
Aluminum	NA[4]	NA	.20	10,000-300,000	71,000	17	7.7	14	14	11	8.9
Arsenic	5.0	500	.01	1-50	5	"-"	-	-	-	.02	.02
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	7.1	4.6	5.3	6.7	4.1	5.9
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	-	-	-	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.21	.04	.08	.07	.05	.47
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.43	.23	.82	.67	.31	.25
Copper	25	2,500	.05	2-100	30	-	.55	.31	.22	.45	.35
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	-	-	-	-	-	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	1.4	.30	2.4	1.9	.95	.51
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.82	.22	.38	.31	.38	.29
Zinc	250	5,000	.05	10-300	50	.14	.51	.16	.16	.27	.23
pH						8.7	9.3	6.6	8.8	8.8	8.7

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Not Available
"-" Means Below Reporting Limit

0307ADG3

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)-------- MA-7D-3-4 1.0	9.0	2.0	SB-7E-2 11.0	20.5[4]
Aluminum	NA[5]	NA	.20	10,000-300,000	71,000	14	9.6	21	9.9	9.9
Arsenic	5.0	500	.01	1-50	5	"-"	.01	-	-	-
Antimony	15	500	.05	NA	NA	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	6.6	6.0	6.4	3.3	2.9
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	.05	-	-	-	.01
Chromium (total)	560	2,500	.02	1-1,000	100	.08	.04	.29	.05	.05
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.62	.35	.37	.14	.14
Copper	25	2,500	.05	2-100	30	5.4	.61	.10	.45	.52
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	.35	-	-	-	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	2.1	.70	.96	.13	.34
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	.04	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.37	.30	.86	.12	.13
Zinc	250	5,000	.05	10-300	50	12	.31	.68	.30	.30
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pH						6.7	8.9	8.0	8.1	8.8

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Saturated Soil Sample
5 Not Available
"-" Means Below Reporting Limit

0307AD63

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)-------- SB-7E-3 2.0	SB-7E-3 16.0	SB-7E-3 26.0[4]	SB-7E-4 3.0	SB-7E-4 11.0	SB-7E-4 21.0[4]
Aluminum	NA[5]	NA	.20	10,000-300,000	71,000	16	3.0	7.4	19	6.8	6.2
Arsenic	5.0	500	.01	1-50	5	"-"	-	-	-	-	-
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	7.3	5.7	8.3	8.5	4.9	4.5
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	.01	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	-	.04	-	-	.02
Chromium (total)	560	2,500	.02	1-1,000	100	.10	.03	.08	.19	.02	-
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.44	.10	.11	.33	.46	.34
Copper	25	2,500	.05	2-100	30	.23	.11	.92	.09	.34	.24
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	-	-	-	-	-	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	.10	-	-	-
Nickel	20	2,000	.05	5-500	40	1.2	.14	1.0	.86	1.4	.76
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.80	.31	.24	.88	.44	.12
Zinc	250	5,000	.05	10-300	50	.15	.09	.43	.74	.29	.16
pH						8.4	9.0	9.0	8.8	8.4	9.5

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Saturated Soil Sample
5 Not Available
"-" Means Below Reporting Limit

0307ADG3

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	Boring and Sample Depth (feet) SB-7E-5 2.0	SB-7E-5 11.0	SB-7E-5 21.0	SB-7E-6 2.5	SB-7E-6 11.0	SB-7E-6 22.0[4]
Aluminum	NA[5]	NA	.20	10,000-300,000	71,000	10	4.6	2.7	16	1.9	4.9
Arsenic	5.0	500	.01	1-50	5	*-*	-	-	-	-	-
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	7.1	3.8	2.9	7.5	3.0	6.8
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	-	-	-	.01	-
Chromium (total)	560	2,500	.02	1-1,000	100	.13	.03	.03	.14	.08	.05
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.23	.10	.08	.50	-	.29
Copper	25	2,500	.05	2-100	30	.25	.50	.11	.22	1.2	.47
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	.42	-	-	-	-	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	.60	.32	.11	1.3	.14	.27
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.46	.24	.27	1.02	.13	.45
Zinc	250	5,000	.05	10-300	50	1.1	.83	.07	2.01	.95	.90
pH						8.2	8.3	8.7	8.8	9.0	8.8

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Saturated Soil Sample
5 Not Available
- Means Below Reporting Limit

0307ADG3

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	Boring and Sample Depth (feet) SB-7F-1 2.0	SB-7F-1 11.0	SB-7F-1 21.0[4]	SB-7F-2 2.0	SB-7F-2 11.0	SB-7F-2 21.0[4]
Aluminum	NA[5]	NA	.20	10,000-300,000	71,000	19	7.7	8.9	20	9.1	9.4
Arsenic	5.0	500	.01	1-50	5	"-"	-	-	-	-	-
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	8.3	4.0	3.1	7.6	5.2	3.8
Beryllium	0.75	75	.01	0.1-40	6	.01	-	-	.01	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	.02	-	-	.02	.01
Chromium (total)	560	2,500	.02	1-1,000	100	.19	.05	.05	.23	.04	.05
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.43	.08	.08	.32	.33	.14
Copper	25	2,500	.05	2-100	30	-	.54	.15	-	-	.30
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	-	-	-	-	-	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	1.5	.30	.18	.96	.60	.45
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.88	.13	.12	.96	.27	.18
Zinc	250	5,000	.05	10-300	50	.10	.38	.12	.20	.20	.21
pH						8.9	8.5	8.8	8.6	8.7	9.1

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Saturated Soil Sample
5 Not Available
"-" Means Below Reporting Limit

0307AD63

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)-------- SB-7F-3 3.0	SB-7F-3 11.0	SB-7F-3 21.0[4]	SB-7F-4 2.0	SB-7F-4 11.0	SB-7F-4 20.5[4]
Aluminum	NA[5]	NA	.20	10,000-300,000	71,000	14	9.3	6.8	12	9.8	5.8
Arsenic	5.0	500	.01	1-50	5	*-*	-	-	-	-	-
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	6.7	4.3	3.3	3.9	5.3	2.8
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	.01	-	-	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.08	.04	.03	.14	.06	.03
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.45	.23	.12	.22	.09	.07
Copper	25	2,500	.05	2-100	30	.23	.97	.30	.53	.35	.11
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	-	-	-	.80	-	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	1.1	1.1	.26	.38	.14	.22
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.61	.30	.10	.60	.19	.12
Zinc	250	5,000	.05	10-300	50	.20	.63	.23	.51	.26	.11
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pH						8.3	9.0	8.6	8.2	8.8	8.8

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Saturated Soil Sample
5 Not Available
- Means Below Reporting Limit

0307ADG3

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	Boring and Sample Depth (feet) SB-7F-5 2.0	SB-7F-5 11.0	SB-7F-5 20.5[4]	SB-7F-6 1.5	SB-7F-6 11.0	SB-7F-6 21.0[4]
Aluminum	NA[5]	NA	.20	10,000-300,000	71,000	16	8.4	5.4	15	10	7.6
Arsenic	5.0	500	.01	1-50	5	"-"	-	-	-	-	-
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	7.4	4.6	3.0	6.9	4.9	2.9
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	.01	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	-	-	-	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.13	.06	.03	.17	-	.05
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.46	.10	.11	.43	.07	.09
Copper	25	2,500	.05	2-100	30	.16	.92	.11	.13	.47	.30
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	-	-	-	-	.73	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	1.4	.14	.20	1.3	.10	.20
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.89	.16	.14	1.1	.18	.13
Zinc	250	5,000	.05	10-300	50	.10	.60	.17	.29	.34	.27
pH						8.5	9.0	9.3	8.6	8.1	8.9

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Saturated Soil Sample
5 Not Available
"-" Means Below Reporting Limit

0307A0G3

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)-------- SB-7F-8 2.0	SB-7F-8 11.0	SB-7F-8 21.0[4]	SB-7G-1 2.5	SB-7G-1 11.0	SB-7G-1 21.0[4]
Aluminum	NA[5]	NA	.20	10,000-300,000	71,000	12	6.9	5.8	19	7.4	7.5
Arsenic	5.0	500	.01	1-50	5	"-"	-	-	-	-	-
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	5.7	6.5	3.3	6.3	3.5	2.7
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	-	-	-	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.12	.04	.04	.13	.05	.04
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.17	.12	.19	.52	.22	.08
Copper	25	2,500	.05	2-100	30	.79	.66	3.0	.23	.49	.24
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	-	-	-	-	-	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	.51	.32	.27	1.4	.23	.23
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.51	.17	.16	.85	.20	.13
Zinc	250	5,000	.05	10-300	50	.70	.65	4.2	.19	.24	.19
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pH						9.4	9.7	8.6	8.0	8.3	8.8

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Saturated Soil Sample
5 Not Available
"-" Means Below Reporting Limit

0307AD03

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)-------- SB-7G-2 3.0	SB-7G-2 11.0	SB-7G-2 21.0[4]	SB-7G-3 2.0	SB-7G-3 16.0	SB-7G-3 21.0[4]
Aluminum	NA[5]	NA	.20	10,000-300,000	71,000	20	8.3	10	14	10	15
Arsenic	5.0	500	.01	1-50	5	*-*	-	-	-	-	-
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	6.2	7.7	5.1	5.3	4.5	4.0
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	.01	.02	-	-	.03
Chromium (total)	560	2,500	.02	1-1,000	100	.13	1.8	.03	.09	.06	.03
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.46	.19	.17	.33	.14	.16
Copper	25	2,500	.05	2-100	30	.20	1.8	.47	.53	.66	.30
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	-	-	-	-	-	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	1.1	.64	.47	.70	.28	.70
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.85	.22	.18	.55	.13	.17
Zinc	250	5,000	.05	10-300	50	.21	2.4	.27	.33	.42	.23
pH						8.3	8.7	8.7	8.3	8.6	8.6

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Saturated Soil Sample
5 Not Available
- Means Below Reporting Limit

0307ADG3

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)-------- SB-7G-4 2.0	SB-7G-4 11.0	SB-7G-4 21.0[4]	SB-7G-6 1.5	SB-7G-6 11.0	SB-7G-6 16.0
Aluminum	NA[5]	NA	.20	10,000-300,000	71,000	15	7.8	5.5	22	8.2	7.7
Arsenic	5.0	500	.01	1-50	5	*-*	-	-	-	-	-
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	5.1	8.3	5.2	4.6	20	4.6
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	.03	.01	-	.02	-
Chromium (total)	560	2,500	.02	1-1,000	100	.11	.04	-	.08	.03	.04
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.20	.37	.37	.30	.55	.16
Copper	25	2,500	.05	2-100	30	.41	1.1	.45	2.1	.53	.29
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	-	-	-	-	-	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	.08	-	-	.20	-
Nickel	20	2,000	.05	5-500	40	.47	1.0	.75	.74	.97	.23
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.47	.30	.14	.25	.50	.14
Zinc	250	5,000	.05	10-300	50	.55	.64	.20	.97	.28	.25
pH						8.9	8.2	8.5	7.7	8.3	8.3

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Saturated Soil Sample
5 Not Available
- Means Below Reporting Limit

0307ADG3

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	Boring and Sample Depth (feet) SB-7G-7 2.5	11.0	21.0[4]	MA-12U-3-1 1.5	9.0	MA-12U-9-1 1.0	8.5
Aluminum	NA[5]	NA	.20	10,000-300,000	71,000	.30	7.6	7.2	20	9.3	19	11
Arsenic	5.0	500	.01	1-50	5	"-"	-	-	.05	.02	.04	.02
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	11	7.1	3.9	6.9	4.1	7.9	5.8
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	.01	-	.01	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	-	-	-	-	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.10	.04	.08	.19	.05	.19	.05
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.30	.20	.14	.45	.53	.29	.63
Copper	25	2,500	.05	2-100	30	.28	.58	1.6	.07	.24	-	.19
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	-	-	-	.01	.02	-	.01
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	.12	-	-
Nickel	20	2,000	.05	5-500	40	.60	.16	.29	1.5	1.3	.10	1.3
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.72	.20	.12	.98	.67	.86	.74
Zinc	250	5,000	.05	10-300	50	.18	.68	2.3	.11	.10	.23	.23
pH						8.2	8.6	8.9	8.6	8.3	8.5	8.3

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Saturated Soil Sample
5 Not Available
"-" Means Below Reporting Limit

0307A063

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	Boring and Sample Depth (feet) SB-12-1 2.0	SB-12-1 11.0	SB-12-1 24.0[4]	SB-12-2 2.0	SB-12-2 16.0	SB-12-2 25.5[4]
Aluminum	NA[5]	NA	.20	10,000-300,000	71,000	21	1.1	1.5	21	3.6	3.1
Arsenic	5.0	500	.01	1-50	5	.02	"-"	.01	.01	.03	.02
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	8.1	2.0	2.2	8.1	9.0	4.5
Beryllium	0.75	75	.01	0.1-40	6	.01	-	-	.01	-	.02
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	-	.02	-	.03	.02
Chromium (total)	560	2,500	.02	1-1,000	100	.18	.11	.09	.18	.03	.05
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.59	.06	-	.48	.28	.18
Copper	25	2,500	.05	2-100	30	-	.09	.16	-	.43	.45
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	.02	-	-	.02	.03	.09
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	1.8	.11	.10	1.3	.92	.14
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	.10
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	1.1	.05	.05	1.1	.26	.20
Zinc	250	5,000	.05	10-300	50	.10	.14	.26	.11	.27	.54
pH						8.4	9.0	8.9	8.6	8.2	8.4

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Saturated Soil Sample
5 Not Available
"-" Means Below Reporting Limit

0307ADG3

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	--------Boring and Sample Depth (feet)-------- SB-12-3 2.0	SB-12-3 11.0	SB-12-3 26.0[4]	SB-12-4 3.0	SB-12-4 11.0	SB-12-4 24.0
Aluminum	NA[5]	NA	.20	10,000-300,000	71,000	8.5	5.0	3.1	15	4.7	3.3
Arsenic	5.0	500	.01	1-50	5	.03	.02	.02	.01	.02	.02
Antimony	15	500	.05	NA	NA	"-"	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	7.7	5.5	3.3	6.6	4.9	3.5
Beryllium	0.75	75	.01	0.1-40	6	-	-	.01	-	-	.01
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	-	.01	-	.01	.03
Chromium (total)	560	2,500	.02	1-1,000	100	.09	.02	.06	.10	.03	.05
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.30	.25	.14	.55	.25	.14
Copper	25	2,500	.05	2-100	30	.21	.19	.45	.23	.20	.23
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	.33	.01	.01	-	-	.04
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	.58	.67	.16	1.3	.70	.20
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	.06	-	-	.09
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.55	.28	.12	.86	.23	.14
Zinc	250	5,000	.05	10-300	50	.68	.09	.45	.16	.09	.25
--------------											
pH						7.8	8.3	8.4	8.0	8.5	8.4

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Saturated Soil Sample
5 Not Available
"-" Means Below Reporting Limit

0307ADG3

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	Boring and Sample Depth (feet) SB-12-5 1.5	11.0	21.0	24.0[4]	SB-12-6 2.5	11.0	21.0	24.0[4]
Aluminum	NA[5]	NA	.20	10,000-300,000	71,000	30	1.5	4.0	5.2	19	7.8	6.7	9.7
Arsenic	5.0	500	.01	1-50	5	.01	.05	.02	.04	.02	.06	.03	.03
Antimony	15	500	.05	NA	NA	"-"	-	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	7.1	2.6	4.5	3.6	7.4	5.2	3.1	4.6
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	.01	.02	.01	-	.02	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.12	.18	.03	-	.08	.04	.03	.05
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.79	-	.27	.15	.75	.40	-	.49
Copper	25	2,500	.05	2-100	30	.19	.50	.26	.19	.24	.77	.25	.44
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	.03	-	.01	.06	.01	.04	.06	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	.05	-	-
Nickel	20	2,000	.05	5-500	40	1.6	.06	.19	.24	1.8	1.2	-.	.18
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.88	.06	.16	.35	.68	.57	.22	.24
Zinc	250	5,000	.05	10-300	50	.18	.32	.27	.46	.19	.51	.16	.47
pH						8.8	8.7	9.1	8.6	8.4	9.0	8.7	9.3

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Saturated Soil Sample
5 Not Available
"-" Means Below Reporting Limit

TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	----------Boring and Sample Depth (feet)---------- SB-CS-1 2.5	11.0	21.0[4]	SB-CS-2 7.78	14.50	18.38	20.51[4]
Aluminum	NA[5]	NA	.20	10,000-300,000	71,000	17	5.2	5.0	4.3	5.7	6.3	6.4
Arsenic	5.0	500	.01	1-50	5	"-"	-	-	-	-	-	-
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	8.1	6.7	4.0	1.8	4.1	2.5	3.1
Beryllium	0.75	75	.01	0.1-40	6	.01	-	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	.03	-	-	-	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.21	.06	.03	.04	.05	.04	.04
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.43	.12	.15	.14	.06	.12	.09
Copper	25	2,500	.05	2-100	30	.19	.71	.15	.11	.22	.25	.38
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	.22	-	-	-	-	-	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	1.3	.31	.25	.30	-	.21	.17
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	-	-	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.81	.14	.13	.25	.12	.10	.09
Zinc	250	5,000	.05	10-300	50	.38	.55	.15	.18	.20	.24	.40
pH						8.4	8.9	9.3	9.2	8.9	8.9	8.9

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Saturated Soil Sample
5 Not Available
"-" Means Below Reporting Limit

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TABLE 3
SUMMARY OF pH AND METAL ANALYTICAL RESULTS
(mg/kg-parts per million)

METAL	STLC[1]	TTLC[2]	STANDARD REPORTING LIMIT	COMMON RANGE FOR SOILS[3]	SELECTED AVERAGE FOR SOILS[3]	Boring and Sample Depth (feet): SB-CS-3 7.78	SB-CS-3 14.85	SB-CS-3 18.38	HA-BKG-1 1.5	HA-BKG-1 9.0	HA-BKG-2 11.0	HA-BKG-2 9.0
Aluminum	NA[5]	NA	.20	10,000-300,000	71,000	7.2	5.6	7.1	26	1.9	7.5	10
Arsenic	5.0	500	.01	1-50	5	"-"	-	-	.03	.01	-	-
Antimony	15	500	.05	NA	NA	-	-	-	-	-	-	-
Barium	100	10,000	.20	100-3,000	430	4.7	4.9	6.5	3.8	3.1	6.8	5.3
Beryllium	0.75	75	.01	0.1-40	6	-	-	-	-	-	-	-
Cadmium	1.0	100	.01	0.01-0.70	0.06	-	-	-	-	.01	-	-
Chromium (total)	560	2,500	.02	1-1,000	100	.05	.06	.05	.11	.18	.06	.07
Chromium VI	5.0	500	.05	---	---	-	-	-	-	-	-	-
Cobalt	80	8,000	.05	1-40	8	.37	.26	.13	.29	-	.39	.50
Copper	25	2,500	.05	2-100	30	.16	.18	.28	.70	.58	.27	.56
Cyanide	NA	NA	2.5	NA	NA	-	-	-	-	-	-	-
Lead	5.0	1,000	.01	2-200	10	-	-	-	.10	-	.08	-
Mercury	0.2	20	.0008	0.01-0.3	0.03	-	-	-	-	-	-	-
Molybdenum	350	3,500	.10	0.2-5	2	-	-	-	-	-	-	-
Nickel	20	2,000	.05	5-500	40	.80	.59	.29	.53	.06	1.1	1.1
Selenium	1.0	100	.05	0.1-2	0.3	-	-	-	-	-	-	-
Silver	5.0	500	.02	0.01-5	0.05	.15	.04	-	-	-	-	-
Thallium	7.0	700	.01	NA	NA	-	-	-	-	-	-	-
Vanadium	24	2,400	.05	20-500	100	.46	.25	.14	.35	.07	.49	.64
Zinc	250	5,000	.05	10-300	50	.20	.34	.38	1.4	.03	.44	.71
pH						9.5	9.5	9.6	7.9	8.5	8.4	8.4

1 Soluble Threshold Limit Concentration, California Code of Regulations, Title 22
2 Total Threshold Limit Concentration, California Code of Regulations, Title 22
3 Lindsey, W.L., 1979, Chemical Equilibria in Soils, John Wiley & Sons
4 Saturated Soil Sample
5 Not Available
"-" Means Below Reporting Limit

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TABLE 4

ANALYTICAL RESULTS OF TOTAL PETROLEUM HYDROCARBON ANALYSES
(mg/kg-parts per million)

Boring Designation[1]	Sample Depth (feet)	Total Petroleum Hydrocarbons Gasoline	Total Petroleum Hydrocarbons Diesel	Oil and Grease Analysis
Building 7B				
HA-7B-1A-1	1.5 - 2.0	"-"	-[2]	810
	9.0 - 9.5	-	-	-
HA-7B-6-1	2.5 - 3.0	-	-	-
	7.5 - 8.0	-	-	-
HA-7B-7-1	2.0 - 2.5	-	-	-
	9.0 - 9.5	-	-	-
HA-7B-7-2	1.0 - 1.5	-	-	-
	9.0 - 9.5	-	-	-
HA-7B-7-3	1.5 - 2.0	-	-	-
	6.5 - 7.0	-	-	-
HA-7B-8-1	2.5 - 3.0	-	-	27
	7.5 - 8.0	-	-	-
Standard Reporting Limit		10	10	25

1 HA indicates hand auger boring; SB indicates auger rig boring.
2 An unknown hydrocarbon mixture in the range of diesel fuel is present in the sample at a concentration of 20 ppm.
"-" Means below reporting limit.

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TABLE 4

ANALYTICAL RESULTS OF TOTAL PETROLEUM HYDROCARBON ANALYSES
(mg/kg-parts per million)
(continued)

Boring Designation[1]	Sample Depth (feet)	Total Petroleum Hydrocarbons Gasoline	Total Petroleum Hydrocarbons Diesel	Oil and Grease Analysis
Building 7D				
HA-7D-1A-1	1.5 - 2.0	"-"	-	-
	6.5 - 7.0	-	-	-
HA-7D-1A-2	1.5 - 2.0	-	-	-
	6.5 - 7.0	-	-	-
HA-7D-1A-3	1.0 - 1.5	-	-	-
	9.0 - 9.5	-	-	-
HA-7D-1A-4	1.0 - 1.5	65	-	120
	8.0 - 8.5	-	-	25
HA-7D-3-1	1.0 - 1.5	-	-	30
	8.5 - 9.0	-	-	-
HA-7D-3-2	1.5 - 2.0	-	-	-
	9.0 - 9.5	-	-	-
HA-7D-3-4	1.0 - 1.5	-	-	30
	9.0 - 9.5	-	-	-
Standard Reporting Limit		10	10	25

[1] HA indicates hand auger boring; SB indicates auger rig boring.
"-" Means below reporting limit.

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TABLE 4

ANALYTICAL RESULTS OF TOTAL PETROLEUM HYDROCARBON ANALYSES
(mg/kg-parts per million)
(continued)

Boring Designation[1]	Sample Depth (feet)	Total Petroleum Hydrocarbons Gasoline	Total Petroleum Hydrocarbons Diesel	Oil and Grease Analysis
Building 7E				
SB-7E-2	2.0 - 2.5	"-"	270	3300
	6.0 - 6.5	-	-	-
	11.0 - 11.5	-	-	-
	16.0 - 16.5	-	-	-
SB-7E-6	2.5 - 3.0	-	-	130
	6.0 - 6.5	-	-	-
	11.0 - 11.5	-	-	-
	16.0 - 16.5	-	-	-
	22.0 - 22.5[2]	-	-	-
Building 7F				
SB-7F-1	6.0 - 6.5	-	-	-
	11.0 - 11.5	-	-	-
	16.0 - 16.5	-	-	-
SB-7F-3	6.0 - 6.5	-	-	-
	11.0 - 11.5	-	-	-
	16.0 - 16.5	-	-	26
Standard Reporting Limit		10	10	25

1 HA indicates hand auger boring; SB indicates auger rig boring.
2 Saturated soil sample.
"-" Means below reporting limit.

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TABLE 4

ANALYTICAL RESULTS OF TOTAL PETROLEUM HYDROCARBON ANALYSES
(mg/kg-parts per million)
(continued)

Boring Designation[1]	Sample Depth (feet)	Total Petroleum Hydrocarbons Gasoline	Total Petroleum Hydrocarbons Diesel	Oil and Grease Analysis
Building 7F				
SB-7F-5	6.0 - 6.5	"-"	-	-
	11.0 - 11.5	-	-	27
	16.0 - 16.5	-	-	-
SB-7F-6	6.0 - 6.5	-	-	-
	11.0 - 11.5	-	-	-
	16.0 - 16.5	-	-	-
SB-7F-7	6.0 - 6.5	-	-	-
	11.0 - 11.5	-	-	-
	16.0 - 16.5	-	-	-
	21.0 - 21.5[2]	-	-	-
SB-7F-8	2.0 - 2.5	10	31	250
	6.0 - 6.5	-	-	-
	11.0 - 11.5	-	-	26
	16.0 - 16.5	-	10	52
	21.0 - 21.5[3]	-	-	-
Standard Reporting Limit		10	10	25

1 HA indicates hand auger boring; SB indicates auger rig boring.
2 Saturated soil sample.
"-" Means below reporting limit.

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TABLE 4

ANALYTICAL RESULTS OF TOTAL PETROLEUM HYDROCARBON ANALYSES
(mg/kg-parts per million)
(continued)

Boring Designation[1]	Sample Depth (feet)	Total Petroleum Hydrocarbons Gasoline	Total Petroleum Hydrocarbons Diesel	Oil and Grease Analysis
Building 7G				
SB-7G-5	6.0 - 6.5	"-"	-	-
	11.0 - 11.5	-	-	-
	16.0 - 16.5	-	-	-
	21.0 - 21.5[2]	-	-	-
SB-7G-6	6.0 - 6.5	-	-	-
	11.0 - 11.5	-	-	-
	16.0 - 16.5	-	-	-
SB-7G-8	6.0 - 6.5	-	-	35
	11.0 - 11.5	-	-	-
	16.0 - 16.5	-	-	-
	21.0 - 21.5[2]	-	-	-
Building 12				
SB-12-5	6.0 - 6.5	-	-	-
	11.0 - 11.5	-	-	-
	21.0 - 21.5	-	-	-
	24.0 - 24.5[2]	-	-	-
Standard Reporting Limit		10	10	25

1 HA indicates hand auger boring; SB indicates auger rig boring.
2 Saturated soil sample.
"-" Means below reporting limit.

TABLE 5

SUMMARY OF PESTICIDES, POLYCHLORONATED BIPHENYL, AND TOTAL ORGANIC CARBON ANALYSES
(mg/kg-parts per million)

Boring Designation	Sample Depth (feet)	Organochlorine Pesticide	Polychlorinated Biphynels	Total Organic Carbon
HA-7A-2-1	6.5 - 7.0	Endosulfan II 0.0096	BRL[1]	---[2]
	9.0 - 9.5	BRL	BRL	---
HA-7B-2-2	1.5 - 2.0	---	---	320
	8.0 - 8.5	---	---	140
HA-7B-3-1	1.5 - 2.0	---	---	450
	9.0 - 9.5	---	---	250
HA-7B-3-2	2.0 - 2.5	---	---	310
	9.0 - 9.5	---	---	280

1 Below reporting limit.
2 This compound not analyzed.

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Volatile Organic Compound Analyses

One hundred and fifty two soil samples were analyzed for VOCs using EPA Method 8240. A summary of volatile organic compound analyses is presented in Table 2. In addition, twenty soil samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes using EPA Method 8020 as part of a total petroleum hydrocarbon scan, and are presented on Table 2 with the other VOCs. The remaining compounds analyzed as part of the TPH scan are described in Table 4. Trichloroethene, tetrachloroethene, 1,1-dichloroethene, 1,2-dichloroethene, toluene, acetone, and methylene chloride were the VOCs most commonly detected. Total xylenes were detected in two soil samples, at boring HA-7D-1A-4 at a concentration of 1,400 ppb at 1.0 foot below grede and in SB-7F-8 at a concentration of 5 ppb at 2.0 feet below grade. Methyl ethyl ketone (2-butanone) was detected in HA-7B-3-1 at a concentration of 50 ppb at 1.5 feet below grade.

pH and Metal Analyses

One hundred and sixty nine soil samples were analyzed for pH, and one hundred and seventy soil samples were analyzed for metals. A summary of all pH and metal analyses is presented in Table 3. pH concentrations throughout the site range from 6.3 to 9.7. Information obtained from the Santa Clara County soil survey indicate that soils in the vicinity of the 395 PMR site are neutral to moderately alkaline. Ranges for each building area investigated are described below:

7A	6.3 - 9.2	7F	8.1 - 9.7
7B	6.6 - 9.2	7G	7.7 - 8.9
7C	6.5 - 8.9	12	7.8 - 9.0
7D	6.6 - 9.3	Chemical Storage	8.9 - 9.6
7E	8.0 - 9.5	Background	7.9 - 8.5

Concentration ranges for those metals detected are described below. Antimony, chrome VI, cyanide, selenium, and thallium were not detected. All values are in parts per million.

aluminum	0.01 - 27.0	copper	0.05 - 5.4
arsenic	0.01 - 0.30	lead	0.01 - 0.80
barium	0.53 - 9.4	molybdenum	0.01 - 1.3
beryllium	0.01 - 0.03	nickel	0.09 - 3.2
cadmium	0.01 - 0.08	silver	0.04 - 0.15
total chromium	0.05 - 1.8	vanadium	0.05 - 1.3
cobalt	0.05 - 0.88	zinc	0.03 - 1.4

Total Petroleum Hydrocarbon Analyses

Seventy-one soil samples were analyzed for total petroleum hydrocarbon compounds. Each sample submitted for TPH analysis was analyzed for gasoline, diesel, BTEX, and oil and grease. Analytical results of the BTEX analysis are described in Table 2 with the other volatile organic compounds. Gasoline, diesel, and oil and grease analyses are summarized on Table 4. Gasoline range compounds were detected in one soil boring, SB-7F-8, at a concentration of 10 ppm at 2.0 feet below grade. Diesel range compounds were detected at two locations, SB-7E-2 and SB-7F-8. Diesel was detected at a concentration of 270 ppm in the 2.0 foot sample in SB-7E-2, and was not detected in any other samples from soil boring SB-7E-2. Diesel was also detected in SB-7F-8 at a concentration of 31 ppm in the 2.0 foot sample, and 10 ppm in the 16.0 foot sample. Diesel was not detected in the 6.0 or 11.0 foot samples in SB-7F-8. Oil and grease was detected in eight soil samples, four samples ranged from 25 to 100 ppm, and four samples ranged from 100 ppm to 3,300 ppm. Sample locations and depths are described in Table 4.

Pesticide, Polychlorinated Biphenyl, and Total Organic Carbon Analyses

Analytical results of pesticide, PCB, and TOC analyses are summarized in Table 5. Two soil samples were submitted for pesticide and polychlorinated biphenyl analyses. No PCBs were detected. One organochlorine pesticide compound was detected at a concentration of 0.0096 ppm in HA-7A-2-1 at 6.5 feet below grade.

Six soil samples were submitted for total organic carbon (TOC) analysis. TOC content in these samples ranged from 140 to 450 ppm.

Total organic carbon analyses were performed to determine the total organic matter content of the soil. The organic matter content together with the pH and the soil type provides information on the mobility of metals in soil. Due to the low concentrations of metals encountered at the site, and the normal range of pH values and organic matter content, the mobility of the metals in soils were not calculated.

RESULTS OF SOIL GAS SURVEY

Soil gas samples were collected and analysed at 73 locations at a Hewlett-Packard site located in Palo Alto, California. Data was collected at depths of 3 to 13 feet below ground surface. Analytical data are presented in Appendix B. A map showing the sample locations is included as Figure 4.

Measurable levels of all volatiles screened, with the exception of ethyl benzene and xylenes, were detected across the site. Depth profiles conducted at three sampling locations (SG-01, SG-10, and SG-14) indicate that concentrations of volatiles increase with depth. These data suggest that groundwater below the probe is the source of VOC contamination detected in soil gases rather than the shallow soils.

Petroleum hydrocarbons (benzene, toluene and total hydrocarbons) were detected in the soil gas across the site. The highest concentrations of benzene and total hydrocarbons were detected at sampling location SG-73 (45 ug/L and 52 ug/L respectively). The highest concentration of toluene was detected at sampling location SG-75 (7 ug/L).

BUILDING 12 SUMP INSPECTIONS

The inside and outside sumps located in the basement of Building 12 were inspected on March 7, 1990 to evaluate the physical condition of these structures. Additional data regarding the sump was obtained from the Levine-Fricke report entitled "Sampling and Analyses of Sump Dewatering System, Building 12, Hewlett-Packard Company, 395 Page Mill Road, Palo Alto, California", dated July 16, 1986.

Inspection of the inside sump showed no visual indications of cracking or open cold-joints in the concrete walls. Approximately three feet of water was present in the sump at the time of inspection, therefore the bottom of tha sump could not be observed. A closed cold-joint was observed in the concrete walls five feet above the bottom (two feet above the water level). The cold-joint suggests that the sump was constructed with more than one concrete pour.

The Levine-Fricke report stated that a water sample was collected from what appeared to be groundwater flowing into the inside sump through the cold-joint in the concrete. The sump's water level is automatically regulated by duplex pumps using float controllers. The lower-most float, activates the pump, initiating sump-water discharge into the sanitary sewer. The pump-float system maintains the water level at the elevation of the lower-most float, approximately three feet above the bottom of the sump. The second pump and float system serves as a backup system which prevents the water level from rising above the elevation of the upper-most float. This float is positioned 4.4 feet above the bottom of the sump. The cold-joint in the concrete is five feet above the bottom of the sump, the pump system keeps the water level in the sump from reaching the level of the cold-joint. Because of the dual and backup pump systems it is unlikely that water from the sump would ever flow out through the cold-joint to groundwater.

Inspection of the outside sump indicated that the concrete was intact, no cracks or deterioration was observed. One foot of standing water was in the bottom of the sump at the time of inspection, so the bottom could not be observed. Two joints were visible in the concrete, one approximately five feet above the bottom (four feet above the water level) and the other one approximately ten feet above the bottom of the sump. The outside sump also has a duplex pump-float system that keeps the water level from exceeding a height of four feet from the bottom of the sump. The lower joint is five feet above the bottom of the sump, one foot above the maximum water level in the sump.

Vinyl chloride has been detected in water samples collected from the Building 12 inside sump. No source of vinyl chloride is known to exist at the 395 PMR site. Vinyl chloride is a breakdown product of volatile organic compounds, such as PCE. The presence of vinyl chloride in water samples collected in the sump may be the result of the breakdown of PCE.

GRAB WATER SAMPLES

Grab groundwater samples were collected from 22 of the 30 hollow stem auger rig soil borings and were analyzed for VOCs and pH. The results of these analyses are presented in Table 6. The following compounds were detected: TCE, PCE, 1,1-DCE, 1,1,1-TCA, 1,1-DCA, and 1,2-DCE.

TCE, 1,1-DCE, 1,1,1-TCA, were detected in all samples except the sample collected from SB-12-1, which did not contain 1,1-DCE or 1,1,1-TCA. TCE was detected at concentrations ranging from 38 ppb to 330 ppb. Concentrations of 1,1-DCE ranged from non-detected to 35 ppb. Concentrations of 1,1,1-TCA ranged from non-detected to 80 ppb. Low concentrations (less than 10 ppb) of 1,1-DCA and 1,2-DCE were detected in nine of the twenty-two samples.

PCE was detected in three grab water samples. The concentrations of PCE detected in the samples collected from Borings SB-12-1, SB-12-2, and SB-12-6 was 11,000 ppb, 1,900 ppb, and 56 ppb, respectively. Borings SB-12-1, SB-12-2, and SB-12-6 are located in the vicinity of monitor well W-12. PCE has been consistently detected in groundwater samples collected from Monitor Well W-12 since the well was constructed in July 1989.

The pH of the samples ranged from a low of 7.0 to a high of 7.9.

ANALYTICAL RESULTS OF GROUNDWATER SAMPLING

Groundwater from fifteen on-site monitoring wells was sampled for C.A.M. metals, which includes the following elements: antimony, arsenic, barium, beryllium, cadmium, chromium (total), chromium VI, cobalt, copper, lead mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc. Groundwater samples were also analyzed for cyanide and aluminum. Analytical results are shown in Table 7. Aluminum, barium, chromium (total), copper, lead, nickel, selenium, and zinc were detected in groundwater. Aluminum was detected in six wells (W-2, W-3, W-4, W-9, W-11, and W-13) at concentrations ranging from 0.3 to 2.1 ppm. Barium was detected in three wells, concentrations ranged from 0.2 to 0.4 ppm. Total chrome was detected in W-11 at 0.03 ppm and in W-13 at 0.01 ppm. Copper was detected in monitor wells W-1A, W-3, W-4, W-5, W-6, W-11, and W-12 at concentrations ranging from 0.06 to 0.67. Confirmatory samples were collected from Wells W-11 and W-12 and copper concentrations (in ppm) were as follows:

W-11	0.61, 0.30
W-12	0.67, 0.31

Lead was detected in wells W-3, W-11, and W-12. Confirmatory samples were also collected in these three wells and show the following lead concentrations in ppm:

W-3	0.0007, 0.0
W-11	0.014, 0.55
W-12	0.048, 0.031

TABLE 6

SUMMARY OF pH AND VOLATILE ORGANIC COMPOUNDS DETECTED FROM GRAB WATER SAMPLES
(EPA METHODS 9045 AND 8240)

Boring		Compound (ug/l-ppb)					
Designation	pH	TCE	PCE	1,1-DCE	1,1,1-TCA	1,1-DCA	1,2-DCE (total)
SB-7E-3	7.1	190	"-"	24	36	5	6
SB-7E-5	7.2	200	-	30	30	6	6
SB-7F-1	7.2	45	-	11	23	-	-
SB-7F-2	7.2	50	-	13	30	-	-
SB-7F-3	7.2	88	-	25	80	-	7
SB-7F-4	7.5	38	-	8	11	-	-
SB-7F-6	7.2	44	-	17	32	-	-
SB-7F-7	7.2	170	-	35	63	-	-
SB-7F-8	7.1	210	-	22	39	-	7
SB-7G-1	7.3	330	-	18	21	-	-
SB-7G-2	7.2	67	-	16	30	-	-
SB-7G-3	7.1	110	-	21	40	-	-
SB-7G-5[1]	7.1	180	-	28	51	5	6
SB-7G-6	7.1	140	-	22	40	-	-
SB-7G-7	7.9	48	-	15	28	-	-
SB-7G-8	7.3	68	-	15	29	-	-
SB-12-1	7.0	260	11,000	-	-	-	-
SB-12-2	7.2	220	1,900	29	21	8	10
SB-12-3	7.1	200	-	23	33	-	-
SB-12-4	7.0	200	-	25	34	7	-
SB-12-5	7.0	230	-	29	48	8	-
SB-12-6	7.2	240	56	26	40	7	5
Standard Reporting Limit		5	5	5	5	5	5

"-" Means below reporting limit.
1 This sample also contained 10 ppb of both 4-Methyl-2-pentanone and 2-Hexanone.

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TABLE 7
GROUNDWATER ANALYTICAL RESULTS OF METAL ANALYSES
(mg/L - parts per million)

METAL	Reporting Limit	Maximum Contaminent Levels[1]	W-1	W-1A	W-2	W-3 (11/22/89)	W-3 (2/27/90)	W-4	W-5	W-6	W-7
Aluminum	0.20	1.0	"_"	-	[redacted]	0.4	0.4	0.5	-	-	-
Antimony	.01/ 0.06	None	-	-	-	-	NA[2]	-	-	-	-
Arsenic	.01/ [redacted]	[redacted]	-	-	-	-	NA	-	-	-	-
Barium	0.20	1.0	0.2	0.2	-	-	NA	-	-	-	-
Beryllium	0.005	None	-	-	-	-	NA	-	-	-	-
Cadmium	0.005	0.01	-	-	-	-	NA	-	-	-	-
Chromium (Total)	0.01	None	-	-	-	-	NA	-	-	-	-
Chromium VI	0.05	0.05	-	-	-	-	-	-	-	-	-
Cobalt	0.05	None	-	-	-	-	NA	-	-	-	-
Copper	0.025/.05	1.0	-	0.06	-	0.46	-	0.11	0.07	0.10	-
Cyanide	0.05	0.20	-	-	-	-	-	-	-	-	-
Lead	0.05/0.005	0.05/0.005	-	-	-	0.007	-	-	-	-	-
Mercury	0.0002	0.002	-	-	-	-	NA	-	-	-	-
Molybdenum	0.05	None	-	-	-	-	NA	-	-	-	-
Nickel	0.04	None	-	-	-	-	NA	-	-	-	-
Selenium	.05/ 0.20	0.01	-	-	-	-	NA	-	-	-	-
Silver	.01/ 0.02	0.05	-	-	-	-	NA	-	-	-	-
Thallium	.01/ 0.40	None	-	-	-	-	NA	-	-	-	-
Vanadium	0.05	None	-	-	-	-	NA	-	-	-	-
Zinc	0.02	5	0.06	0.09	-	0.17	NA	0.14	-	0.06	-

1 State or EPA Drinking Water Standards, California RWQCB, Central Valley Region, "A Compilation of Water Quality Goals", Marshack, 1989

2 This compound not analyzed

"_" Means below reporting limit

TABLE 7

GROUNDWATER ANALYTICAL RESULTS OF METAL ANALYSES

(mg/L - parts per million)

METAL	Reporting Limit	Maximum Contaminent [1] Levels	W-8	W-9	W-10	W-11 (11/21/89)	W-11 (2/21-89)	W-12 (11/21/89)	W-12 (2/22/90)	W-13	W-14
Aluminum	0.20	1.0	"-"	-	-	-	0.3	NA[2]	-	[redacted]	"-"
Antimony	0.06	None	-	-	-	-	-	-	NA	-	-
Arsenic	0.20	0.05	-	-	-	-	-	-	NA	-	-
Barium	0.20	1.0	-	-	-	0.4	-	-	NA	0.2	-
Beryllium	0.005	None	-	-	-	-	-	-	NA	-	-
Cadmium	0.005	0.01	-	-	-	-	-	-	NA	-	-
Chromium (Total)	0.01	None	-	-	-	0.03	-	-	NA	0.01	-
Chromium VI	0.05	0.05	-	-	-	-	-	NA	-	-	-
Cobalt	0.05	None	-	-	-	-	-	-	NA	-	-
Copper	0.025	1.0	-	-	-	0.61	0.30	0.67	0.31	-	-
Cyanide	0.05	0.20	-	-	-	-	-	NA	-	-	-
Lead	0.05/0.005	0.05/0.005	-	-	-	[redacted]	[redacted]	[redacted]	[redacted]	-	-
Mercury	0.0002	0.002	-	-	-	-	-	-	NA	-	-
Molybdenum	0.05	None	-	-	-	-	-	-	NA	-	-
Nickel	0.04	None	-	-	-	0.07	-	-	NA	-	-
Selenium	0.20	0.01	-	-	0.008	-	-	-	NA	-	-
Silver	0.02	0.05	-	-	-	-	-	-	NA	-	-
Thallium	0.40	None	-	-	-	-	-	-	NA	-	-
Vanadium	0.05	None	-	-	-	-	-	-	NA	-	-
Zinc	0.02	5	-	-	-	0.46	0.13	0.32	NA	0.09	0.05

1 State or EPA Drinking Water Standards, California RWQCB, Central Valley Region, "A Compilation of Water Quality Goals", Marshack, 1989

2 This compound not analyzed

"-" Means below reporting limit

Selenium was detected in W-10 at 0.008 ppm. Nickel was detected in W-11 at 0.07 ppm during one sampling round and was not detected during the second sampling round. Zinc was detected in nine wells (W-1, W-1A, W-3, W-4, W-6, W-11, W-12, W-13, and W-14) at concentrations ranging from 0.09 to 0.46 ppm.

EVALUATION OF DATA

This section presents an evaluation of the soils and water quality data collected during this investigation.

ANALYTICAL RESULTS FOR SOIL SAMPLES

Results were presented in the previous section for analysis of soil samples for metals, pH, polychlorinated biphenyls, pesticides, VOCs, and petroleum hydrocarbons. An evaluation of these results is presented below.

Metals and pH Analyses

Relevant criteria by which metals analytical results can be evaluated include the following:

- "Common concentration ranges" and "average concentration values" for selected compounds as presented in 'Chemical Equilibrium in Soils' (Lindsay, 1979), and

- STLC and TTLC values as outlined in the State of California Code of Regulations, Title 22, Division 4, Section 66699.

Table 3 summarizes the "common concentration range" for the various metals detected in soils at the site. The values presented represent common ranges of background concentrations of metals observed in soils.

Comparison of the analytical results for metals, with the criteria outlined above indicate that metal concentrations detected in soils at the 395 PMR site are within a normal range of background concentrations for soils. In addition, metals concentrations detected were well below soluble threshold limit concentration and total threshold limit concentration (STLC and TTLC) values. pH analysis were performed in conjunction with metals analyses to determine whether a low pH environment exists in soils at the 395 site, since a low pH environment would provide for increased mobility of metals. The range of pH values observed in soils at the site are within the neutral to alkaline range, therefore, the mobility of metals would be low under these soil conditions. The metals and pH data available for the site are not indicative of either soil contamination at the site or a potential source of contamination to groundwater.

Polychlorinated Biphenyl's and Pesticides

Two soil samples from one location, HA-7A-2-1 were submitted for laboratory analysis for polychlorinated biphenyl's (PCBs) and pesticides. No PCBs were detected. The pesticide Endosulfan II was detected at 9.6 ppm in the 6.5 to 7.0 foot sample but was not detected in the deeper 9.0 to 9.5 foot sample. The "designated level in a solid to protect groundwater" as provided in "Designated Level Methodology for Waste Classification and Clean-up Level Determination" (Marshack, 1988) is 74 ppm. Since the single concentration of Endosulfan II detected is well below the regulatory guideline no further investigation or remedial activity is recommended for this area.

VOCs and Petroleum Hydrocarbons

QA/QC Data Review

Review of soil analytical data for volatile organic compounds indicates that chemicals frequently used in analytical laboratories (acetone and methylene chloride) were detected in a number of the soil samples and the laboratory blanks analyzed on the days the analyses were performed. The presence of acetone and methylene chloride in any of the soil samples is therefore considered suspect. Acetone and methylene chloride concentrations, as indicated in Table 2, generally range from 20 to 50 ppb.

Approximately two-thirds of the samples submitted to CHEMWEST Analytical Laboratory for EPA Method 8240 analysis were shipped to CompuChem Laboratory in North Carolina for analysis. CompuChem employs methods identified in the USEPA's Current Contract Laboratory Program (CLP) and reports data on CLP formatted data sheets which are different from the CHEMWEST data sheets. CHEMWEST received this information and reported the analytical results to McLaren in the usual CHEMWEST format. McLaren also directly received a portion of the CompuChem data sheets for review. In comparing the CompuChem and CHEMWEST data sheets for given samples it was found that CompuChem flagged most of the concentrations of acetone and methylene chloride reported with a note identifying possible/probable blank contamination and warning the data user to take appropriate action. The CHEMWEST data sheets, however, for the same analytical results, do not, in general, give any indication of the apparently high potential for sample contamination with these compounds at CompuChem. Additional information regarding this matter has been requested from both CHEMWEST and CompuChem.

In addition to laboratory contamination, there apparently was also a potential for field contamination of samples with toluene. Soil samples were collected for the investigation in brass tubes which were sealed with plastic caps and electrical tape. Based upon recent experience with investigations conducted concurrently at other sites, it appears that the electrical tape may present a source of toluene contamination to the soil samples. Additional study would be required to verify potential field sources of sample contamination.

Analytical Data Screening Criteria

Soil VOC concentrations on the order of 20 to 50 ppb were detected for a number of compounds. The presence of chemical compounds at these trace concentrations does not necessarily indicate that a soil chemical problem exists at these sample locations. To develop a screening criteria to evaluate VOC data, RWQCB "clean up levels" for a nearby facility, and "guidance values" cited by Marshack were reviewed. "Clean-up levels" for soil remediation were issued by the California Regional Water Quality Control Board, San Francisco Bay Region, in a "Notice of Tentative Site Cleanup Requirements" for the Hewlett-Packard Company, 640 Page Mill Road, Palo Alto, California site February 2, 1990. In those SCRs the RWQCB specifies that soils will be excavated in the vicinity of a known source area for VOCs "to the concentration level of 1 ppm for volatile organic compounds". "Designated VOC levels in a solid to protect groundwater" are presented in the guidance document by Jon Marshack, Central Valley Region, entitled "The Designated Level Methodology for Waste Classification and Cleanup Level Determination; dated September 1988, and are as follows:

TCE	5000 ppb	PCE	2000 ppb
1,1-DCE	20000 ppb	1,2-DCE	500 ppb
toluene	1000	methylene chloride	5000 ppb

The Marshack values are included because no other VOC guideline values exist. Based on the "clean-up levels" and "designated levels in a solid to protect groundwater" outlined above, a VOC concentration of 500 ppb has been selected as the screening criteria.

The regulatory standard for evaluation of oil and grease concentrations in soil is 50 ppm based on the Santa Clara Valley Water District Guidelines (November, 1989). Soil samples which exceed 50 ppm are discussed below.

Five areas of the site were found to contain soils with concentrations of VOCs and/or petroleum hydrocarbons exceeding the criteria outlined above. These are:

- Building 7D (HA-7D-1A-1 through -4);
- Building 7B (HA-7B-1A-1);
- Former Building 7E (SB-7E-2 and SB-7E-6);
- Former Building 7F (SB-7F-8); and
- Building 12 (HA-12U-9-1, SB-12-1 and -2).

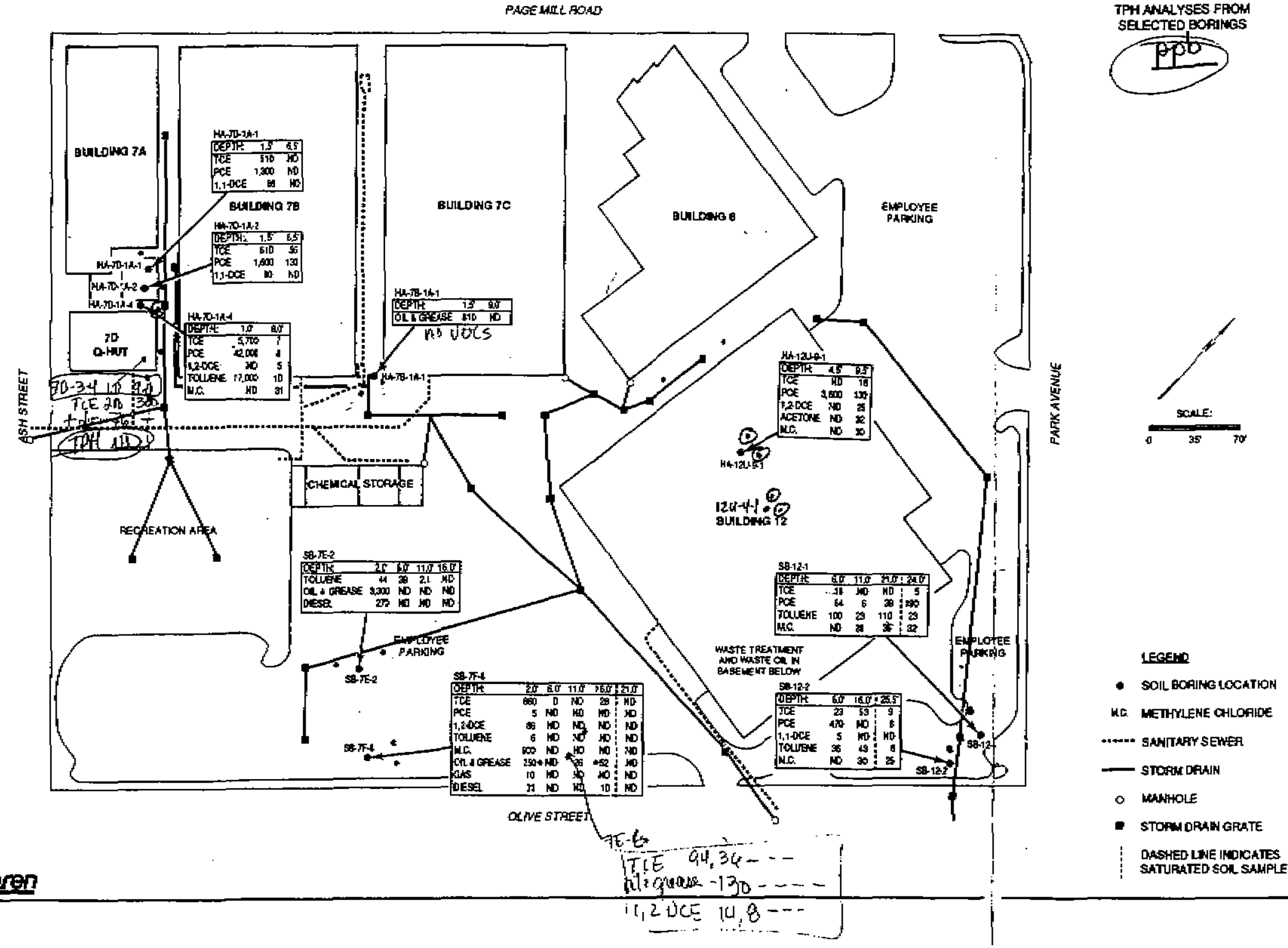
No VOC or TPH concentrations were detected above the levels outlined in the screening criteria in Buildings 7A, 7C, or Former Building 7G.

Soils quality data from each of the above areas is presented in Figure 14 and discussed below.

Building 7B

Hand auger Boring HA-7B-1A-1 is located adjacent to the eastern corner of Building 7B near the sump. Soil samples were collected at depths of 1.5

FIGURE 14
RESULTS OF VOC AND
TPH ANALYSES FROM
SELECTED BORINGS



McLaren

to 2.0 feet and 9.0 to 9.5 feet below grade. Oil and grease was detected in the 1.5 to 2.0 foot sample at a concentration of 810 ppm. 1,2-DCE, and toluene were also detected at concentrations of 8 ppb and 20 ppb, respectively. No VOC or TPH compounds were detected in the 9.0 to 9.5 foot sample.

No VOCs were detected in samples from the boring at concentrations above 20 ppb. The oil and grease appears to be shallow and localized and associated with the sump.

Building 7D

Soil borings HA-7D-1A-1 through -4 were drilled to evaluate soil conditions beneath the enclosed former chemical storage room located between Buildings 7A and 7D. Analytical results from soil samples collected at a depth of one to two feet below grade indicate that concentrations of TCE (36 to 5,700 ppb), PCE (60 to 42,000 ppb), 1,1-DCE (<100 ppb), 1,2-DCE (<100) and toluene (non-detect to 17,000) are present within this depth interval.

Analytical data from soil samples collected at depths of 6.5 to 9.5 feet below grade in these same four borings indicate a significant decrease in detected chemical concentrations with depth. Data show that at a depth of 6.5 feet the total VOC concentrations are on the order of 200 ppb; at a depth of 8.0 feet, VOC concentrations are on the order of 30 ppb; and at a depth of 9.0 feet the total detected VOC concentrations are approximately 10 ppb.

Analytical data from soil borings drilled in the former chemical storage room indicate that the fine grained clayey unit (lithologic unit A) which underlies the entire facility has restricted the vertical migration of VOCs. This clayey unit extends to a depth of approximately 8.0 feet below grade.

Analytical data from adjacent Building 7A show that the lateral extent of elevated VOC concentrations are limited to the former chemical storage room. Analytical data from the seven soil borings drilled in Building 7A indicate no detectable concentrations of TCE, PCE, 1,1-DCE, or 1,2-DCE are present in any of the samples analyzed.

Based on the analytical data, the vertical and lateral limits of VOCs beneath the former chemical storage room are defined, and primarily restricted to depths of two to six feet below ground surface. Groundwater beneath this portion of the facility is at an approximate depth of 20 feet. Therefore, the potential for chemical migration to groundwater is considered minimal.

Former Building 7E

Soil Borings SB-7E-2 and SB-7E-6 are located in the employee parking lot near the southeastern boundary of the site. The locations of these borings were selected to address the former Building 7E which housed foundry and die cast operations.

Analytical results from soil samples collected from beneath this former building indicate localized areas of petroleum hydrocarbon compounds in the oil and grease range are present at depths of 2 to 2.5 feet below grade. In soil boring SB-7E-2 an oil and grease concentration of 3,300 ppm was detected at two feet and in SB-7E-6 an oil and grease concentration of 130 ppm was detected at 2.5 feet. The soil sample SB-7E-2 additionally included petroleum compounds in the diesel range at a concentration of 270 ppm. No petroleum hydrocarbon compounds were detected in any of the samples collected at these locations at greater depths.

VOC analytical data obtained from these borings indicate that no VOC concentrations above the screening criteria are present. The maximum total VOC concentration detected was in SB-7E-6 at 133 ppb. This sample was collected at a depth of 2.5 feet below ground surface.

Analytical data obtained from borings located within former Building 7E indicate that past activities have resulted in localized areas of elevated TPH concentrations. No areas of elevated VOC concentrations were detected. Data indicate that soil remediation will be required in the vicinity of SB-7E-2.

Former Building 7F

Eight borings were drilled to investigate soil conditions beneath this building. TPH and VOC analytical data from these borings indicate that all soil samples, with the exception of those collected in SB-7F-8, have detected concentrations below the screening criteria. In SB-7F-8, criteria are exceeded in only the sample collected at a depth of 2 feet below ground surface.

Analytical data from SB-7F-8 at two feet below grade indicate total TPH concentrations of 290 ppm. Detected petroleum compounds were primarily in the oil and grease range, but included also those in the diesel and gasoline range. TCE (860 ppb), PCE (5 ppb), 1,2-DCE (86 ppb), toluene (6 ppb) and methylene chloride (900 ppb) were also detected in this sample. In the four samples collected below this depth the maximum TPH concentration detected was 52 ppm, and the total VOC concentration 28 ppb.

Analytical data from SB-7F-8 indicate that the TPH and VOC concentrations detected decrease significantly with depth. The fine grained clayey unit (lithologic Unit A) extends to a depth of 8.5 feet at this location has restricted the vertical movement of chemicals.

Data indicate that the vertical extent of chemical compounds above the screening criteria are limited to a depth of two to six feet below ground surface. Additional data are needed to evaluate the lateral limits of compounds detected at this location.

Building 12

Eight borings were drilled to investigate soil conditions beneath and adjacent to Building 12. Two of these borings detected VOC concentrations above the screening criteria. These were HA-12U-9 and SB-12-2. HA-12U-9 was drilled to investigate the former PCE degreaser. SB-12-2 was drilled to evaluate soil quality in the vicinity of monitoring well W-12 and to investigate the localized (above background) VOC concentrations detected in the soil gas survey.

Analytical data from HA-12U-9 indicate that at a depth of 4.5 feet below ground surface the PCE concentration was 3,600 ppb. The sample collected at a depth of 9.5 feet detected PCE at a concentration of 130 ppb. Additional data are necessary to characterize the vertical and lateral limits of the PCE in the vicinity of the former PCE degreaser.

Analytical data from SB-12-2 indicate that only one soil sample is close to the screening criteria. This sample was collected at a depth of 6 feet below ground surface. Detected VOCs in this sample were TCE (23 ppb), PCE (470 ppb), 1,1-DCE (5 ppb), and toluene (36 ppb). Data from the soil sample collected from a depth of 16 feet below ground surface in this boring indicate TCE and toluene are present at concentrations of 53 ppb and 43 ppb, respectively.

Analytical data from SB-12-2 and adjacent boring SB-12-1 indicate that VOCs are present at low concentrations within this area of the facility. The source of these compounds is not known. Additional data are necessary to evaluate the lateral limits of these compounds. Lithologic data from the drilling of these borings indicate that clayey units are present from depths of 2.5 to 25.0 feet below ground surface. The presence of these clayey soils will restrict the vertical and lateral migration of these compounds. Groundwater was observed during drilling at this location at 23.0 feet below ground surface.

EVALUATION OF GRAB WATER SAMPLE ANALYSES

The results of the grab water samples collected during drilling and analyzed for pH and VOCs are consistent with the compounds detected and concentrations observed during last the quarterly sampling round and previous quarterly sampling rounds as shown in the "Quarterly Self-Monitoring Report, Hewlett-Packard Company, 395 Page Mill Road facility, Palo Alto, California", dated January 15, 1989.

CONCLUSIONS AND RECOMMENDATIONS

A comprehensive source identification investigation was completed which included soil gas sampling, and soil sampling at all known or suspected potential source areas, including potential discharge locations such as storm drains, sanitary sewer lines, and sumps. Grab groundwater samples were collected at selected soil boring locations and were analyzed for pH and the presence of volatile organic compounds. In addition, groundwater samples were collected from the fifteen existing on-site monitor wells and analyzed for metals.

METALS

One hundred and seventy soil samples were analyzed for metals from depths ranging from one to 24 feet below grade. Soil analytical values for metals at the 395 PMR site are within a normal range of background concentrations for soils, and none of the concentrations reported for metals exceed the STLC or TTLC criteria. Based on the data the HP 395 PMR facility is not a source of either soil metal contamination or a potential source of metal contamination in groundwater.

Analysis of groundwater samples from existing monitor wells W-11 and W-12 detected lead and copper in samples from both the initial sampling round and later confirmatory sampling rounds. Aluminum was detected in groundwater samples from monitor wells W-2 and W-13.

Concentrations of copper, nickel, selenium, chromium, zinc, and barium detected in groundwater samples are below the State or EPA drinking water standards and maximum contaminant levels. Concentrations of lead exceed the MCL in groundwater samples collected from monitoring wells W-2 and W-13. The source of these compounds is not known. Based on the extensive number of soil samples collected and analyzed for metals, the thoroughness of the source identification investigation, and the chemical use history the metals detected in groundwater are not believed to be associated with historic activities conducted at the 395 site.

VOLATILE ORGANIC COMPOUNDS

Based on the investigation results, the 395 PMR facility is not considered a source of VOCs detected in groundwater beneath the facility, with the exception of the former waste solvent tank previously discussed and the as yet unidentified source of PCE detected in the vicinity of W-12.

- One hundred and fifty-two soil samples were analyzed for VOCs;
- Of the 152 samples analyzed only five showed VOC concentrations equal to or greater than 500 ppb;

- Where VOC concentrations did exceed the 500 ppb level, significant decreases in concentration were observed with depth, indicating that vertical migration was limited by the fine grained clay unit underlying the site.

The VOC data do indicate three areas where additional investigations are recommended. These areas are the two degreasers in Building 12, (12U-4 and 12U-9), and the vicinity of monitor well W-12. No data was collected from 12U-4 due to denial of the hand sampling equipment, therefore sample collection is recommended in this area. As discussed previously additional information is required to verify the lateral extent of compounds detected in the vicinity of 12U-9. Additional data is also required to determine the source of chemicals detected in soil and groundwater in the vicinity of W-12.

TOTAL PETROLEUM HYDROCARBONS

Soil analytical data indicate the presence of TPH compounds above regulatory guideline levels in four areas of the 395 PMR site. Oil and grease concentrations were detected above regulatory levels at Building 7B, Building 7D, former Building 7E, and former Building 7F. Diesel and gasoline compounds were detected above regulatory levels at Building 7D. Diesel compounds were also detected above regulatory levels at former Building 7E. Additional investigations are recommended to define the lateral extent of the TPH compounds detected in these areas.

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5

June 1, 1989

Ms. Meredith Durant
Environmental Coordinator
Hewlett-Packard Company
Stanford Park Division
1501 Page Mill Road, Building 5 Upper
Palo Alto, California 94304

Dear Ms. Durant:

CHEMICAL USE HISTORY, HEWLETT-PACKARD FACILITY, PALO ALTO FABRICATION CENTER, 395 PAGE MILL ROAD, PALO ALTO, CALIFORNIA

Enclosed is the "Chemical Use History, Hewlett-Packard Facility, Palo Alto Fabrication Center, 395 Page Mill Road". This report presents the results of the chemical use history survey performed for the 395 Page Mill Road facility. The scope of work for this survey is described in the "Preliminary Cost Estimate for Work Outlined in Site Cleanup Requirements" dated April 3, 1989, and was prepared in accordance with the April 19, 1989 Site Cleanup Requirements issued by the Regional Water Quality Control Board (RWQCB).

Each building's historical and current chemical use, storage, and disposal practices were researched and evaluated. Information was obtained from Hewlett-Packard records and selected memorandums, Palo Alto City and Palo Alto Fire Department records, and interviews with site personnel.

If you have any questions, please call.

Very truly yours,

Del Christenson

Del Christenson, REA
Principal Scientist

cc: Mr. Ken Sutherland

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INTRODUCTION

OBJECTIVE OF REPORT

This report presents the results of a chemical use history survey conducted at the Hewlett-Packard Palo Alto Fabrication Center facility in accordance with Site Cleanup Requirements issued April 19, 1989 by the Regional Water Quality Control Board (RWQCB). This survey was conducted during April and May 1989 to summarize the types and quantities of chemicals used at the facility and handling of these chemicals both currently and historically. Available information was assembled from internal documents and memoranda provided by Hewlett-Packard, review of aerial photographs and facilities drawings, and employee interviews. Areas of the facility where chemicals were used or discharged were identified and evaluated.

SITE DESCRIPTION

The 395 Page Mill Road (395 PMR) facility is located in Palo Alto, California. The site is bordered by Page Mill Road, Olive Avenue, Ash Street, and Park Boulevard. The locations of current facilities and monitor wells at the 395 PMR site are shown in Figure 1.

The 395 PMR facility was constructed and occupied by Hewlett-Packard beginning in the early 1940's and has housed various industrial operations relating to the manufacture of electronic equipment. Presently, industrial activities at the site include plastics molding and fabrication and finishing of aluminum parts. The site is presently occupied by six buildings and a chemical storage shed. In addition to the current facilities at the site, three buildings which were previously located in the southeast portion of the site were evaluated.

The building now known as Building 7A was constructed in 1942 and housed all Hewlett-Packard electronic manufacturing and assembly operations at the time. Historically, chemical milling, semi-conductor, and photo-conductor operations were reported to have occupied Building 7A. This building currently houses a model shop and a model painting area.

The building now known as Building 7B was constructed in 1948. Historically, Building 7B has housed plating, painting, machining, assembly operations, and a model shop. Building 7B currently houses the Corporate Color (paint) Lab, silkscreening and film developing, welding, grinding, milling, riveting areas, and a machine maintenance area.

The building now known as Building 7C was constructed in 1948 and housed assembly and wiring operations, shipping and receiving, and quality control. Building 7C houses similar operations today, including shipping and receiving, quality control, limited sheet metal fabrication, and plastic molding operations.

The building now known as Building 7D, a military style Quonset hut, was constructed in 1942. Building 7D was the original foundry building where die casting operations were conducted. Since the 1950's, Building 7D has been used as a garage for vehicle repair. Building 7D is currently used primarily for non-chemical storage, although fork lift repair is also conducted in 7D.

The buildings now known as Buildings 7E, 7F, and 7G were constructed in the 1960's and demolished in the 1970's. Building 7E housed the die casting shop (which moved from 7D) and a machine shop. No other operations are reported to have been conducted in Building 7E. Building 7F was reported to have been the wood shop and weld shops. Building 7G is reported to have been a machine shop a paint shop, and a storage area. An open air drum storage area was located adjacent to Building 7G.

The building now known as Building 8 was constructed in 1954 and has been used solely as offices and research and development laboratories. Building 12 and the chemical storage shed were constructed in 1976. Building 12 houses aluminum foundry die casting operations, sheet metal fabrication, painting operations, solvent and waste oil above-ground storage tanks, and a waste water treatment facility. The chemical storage shed is approximately 2,000 square feet in area and is used for chemical barrel storage.

In addition to the above described facilities, a 1,000-gallon underground waste solvent storage tank, a 500-gallon concrete neutralization tank, a 1,000-gallon holding tank and four sumps have been previously located at the 395 PMR facility. The 1,000-gallon underground solvent tank was installed in 1978 to collect waste solvents from on-site activities. The tank was located northwest of the drum storage shed. It was abandoned in 1982 and removed in July 1986. The concrete neutralization tank had an approximate capacity of 500 gallons and was located between Buildings 7A and 7D. This sump was installed in the 1960's and was removed in July 1986. The 1,000-gallon holding tank was located adjacent to Building 7A and parallel to Ash Street. This tank was removed in 1981. Two drainage sumps are located in the basement of Building 12. The purpose of these sumps is to prevent groundwater from entering the basement of Building 12 which is located approximately 14 feet below ground surface. Two additional sumps are located at the eastern end of Building 7B. One of these sumps houses valves for the fire main and one drains to the city sewer.

An agricultural well located at the 395 PMR site was abandoned in accordance with Santa Clara County Health Departments Requirements on November 6, 1975.

SUMMARY OF PREVIOUS INVESTIGATIONS

In 1983, Applied Earth Consultants (AEC) constructed Wells W-1 and W-1A on the northeast side of the underground storage tank. The purpose of this investigation was to investigate soil and groundwater adjacent to the tank to determine if chemicals from the tank had leaked into the soil. During this investigation, the compounds 1,1,1-trichloroethane (TCA), trichloroethylene (TCE), and tetrachloroethylene (PCE) were detected at low to moderate concentrations in soil samples collected within saturated zones from 20, 35, and 50 feet. Water samples from Well W-1 showed low concentrations of TCE.

From May 1985 to February 1986, Levine-Fricke constructed six monitor wells (W-2 through W-7) to collect soil samples, determine groundwater flow directions, and monitor water quality upgradient and downgradient of the former underground tank. Monitor well locations are shown in Figure 1. The results of this well drilling program were: (1) Soil samples from upgradient and downgradient wells (W-2, W-3, and W-4) showed toluene and TCE at non-detectable to low concentrations (all concentrations were below 180 ppb toluene and 320 ppb TCE); (2) Only one soil sample collected above the water table showed concentrations of toluene and TCE; (3) Water samples from upgradient wells showed concentrations of TCA, TCE, PCE, 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethylene (1,1-DCE), 1,2-dichloroethane (1,2-DCA), and trans-1,2-dichloroethylene (trans) coming onto the property; and (4) Water samples from downgradient wells showed the same chemicals as the upgradient wells and at similar concentrations.

In May, 1986, Levine-Fricke sampled the two sumps in the basement of Building 12. TCE, TCA, PCE, trans, and lesser amounts of vinyl chloride and 1,1-DCE have been detected in sump samples.

In July 1986, Levine-Fricke removed the 1,000-gallon waste solvent tank. Samples of the liquid within the tank showed high concentrations of 1,1-DCA, toluene, TCA, 1,2-DCA, acetone, PCE, methyl ethyl ketone (MEK), and 4-methyl-2-pentanone. Soil samples collected beneath the tank showed moderate to high concentrations of TCA, 1,1-DCA, PCE, acetone, MEK, and toluene. A pipeline existed connecting floor drains in the southeast portion of the drum shed to the former tank. Soil samples collected three to four feet below the pipeline joints showed non-detectable to low concentrations of TCE. This pipeline was cemented in and capped off at the same time that the tank was removed. Portions of the pipes between the chemical storage shed and the underground solvent tank are still in ground, cemented off at both ends.

The 500-gallon concrete clarifier tank between Building 7A and the Quonset Hut (Building 7D) along Ash Street was also removed in July 1986. No detectable concentrations of volatile organic chemicals were found in soil samples collected directly beneath the tank at 6 feet below grade. The 1,000-gallon holding tank adjacent to Building 7A and Ash Street was reported to have been removed in 1981.

These previous investigations have indicated that the former underground waste solvent tank is a source of chemicals to underlying soils and groundwater. The extent of lateral migration from the tank was believed to be limited to the immediate vicinity of the former tank. This conclusion was based on data from on-site monitor wells which indicated that groundwater flow was predominately to the east and that both upgradient and downgradient wells showed similar concentrations of VOCs.

Based on investigations conducted by McLaren at the Hewlett-Packard 640 Page Mill Road facility in early 1987, it was determined that groundwater flow in the area is greatly affected by dewatering of the Oregon Expressway Underpass. Correlation of water levels between Hewlett-Packard's 395 Page Mill Road and 640 Page Mill Road wells indicated that groundwater flow beneath the 395 Page Mill Road site was predominately to the north, towards the underpass.

To verify the groundwater flow direction, three additional monitor wells (W-8, W-9, W-10) were installed by McLaren in January and February 1987 downgradient of the former underground waste solvent tank. These investigations indicated that groundwater flowing off-site showed similar concentrations of VOCs to that flowing on-site. Quarterly groundwater monitoring has been conducted but no further investigations have been performed to date.

Somewhat higher concentrations of chemical compounds in Monitor Well 4 (versus other on-site wells) have prompted the California Regional Water Quality Control Board (RWQCB) to request additional information regarding the 395 PMR facility. The RWQCB adopted Site Cleanup Requirements (SCR) in April 1989 which required a chemical use history, groundwater characterization, source identification and a feasibility study for the 395 PMR site. This report has been prepared to fulfill the chemical use history portion of the Site Cleanup Requirements.

SCOPE OF WORK PERFORMED

The scope of work performed for this project includes a records search, employee interviews, review of previous reports, and review of historical aerial photographs. Below is a description of each of these information sources. Information that is available for the time period prior to 1982 is based primarily on: 1) aerial photographs, 2) employee interviews, 3) Hewlett-Packard memoranda, and 4) facility drawings (incomplete). In the subsequent section, History of Chemical Usage at 395 PMR, results of these reviews are presented building by building, except historical photographs which are presented by time period and are shown in Appendix B.

RECORDS SEARCH

The chemical use history survey was performed in April and May 1989 and included a record search of facilities inside the Hewlett-Packard 395 PMR buildings. This review included a search and detailed study of available construction drawings and as-built plans for each building to delineate chemical use areas. Drawings and plans for the 395 PMR facilities are located in Building 7A.

Available memoranda and additional internal documents were provided by Hewlett-Packard personnel. Information from the Palo Alto Fire Department and the City of Palo Alto was also obtained and reviewed.

EMPLOYEE INTERVIEWS

Employee interviews were conducted with Hewlett-Packard personnel to verify locations identified on plans, to document historical chemical use practices, and to identify any possible spill occurrences and locations. Those interviewed included the Hewlett-Packard archivist, Stanford Park Division environmental personnel, the 395 PMR facilities manager and facilities personnel, process development engineers, sheet metal engineers and 395 PMR health and safety personnel. Employees with the greatest number of years at the site were interviewed whenever possible. Information obtained was verified with more than one person whenever possible.

PREVIOUS REPORTS

Reports by other investigators were obtained and studied to aid in the search for historical chemical use information. These included the following investigation reports:

- "Preliminary Investigation of Industrial Waste Sources and Discharges" by Engineering Science, Inc. (ESI), dated August 1970;

- "Subsurface Geologic Investigation and Sampling-Underground Solvent Storage Tank" by Applied Earth Consultants (AEC), dated August 1983;
- "Hydrogeologic Assessment Hewlett-Packard Facility 395 PMR" by Levine-Fricke (LF), dated October 1985;
- "Phase II Hydrogeologic Assessment Hewlett-Packard Facility 395 PMR" by LF, dated April 1986;
- "Sampling and Analysis of Sump Dewatering Systems" by LF, dated July 1986;
- "Report on Excavation and Removal of Underground Storage Tanks" by LF, dated December 1986, and
- "Data Report-Construction and Sampling of New On-Site Wells (W-8, W-9, W-10)" by McLaren, dated April 1987.

REVIEW OF HISTORICAL AERIAL PHOTOGRAPHS

Historical aerial photographs were reviewed to determine the chronology and location of the various buildings which have occupied the current Hewlett Packard 395 Page Mill Road site bounded by Ash Street, Olive Avenue, Park Street, and Page Mill Road. For several of the photographs, the exact dates the photos were taken were unknown. These dates have been estimated based on known landmarks. Photographs were reviewed for the years 1941, 1942-1943, 1951, 1951-1952, 1954-1956, 1958-1959, and 1970. Photographs were obtained from Hewlett Packard, the US Geological Survey archives, and the Fairchild Collection housed at Whittier College.

In addition, a historical Sandborn map from 1949 was reviewed. Sandborn maps were generated for insurance underwriters to determine the risk in insuring individual buildings in urban areas. Such maps were updated periodically to show new construction.

In the 1941 photograph (Figure A-1), Hewlett Packard buildings had not yet been built. The land use of the block was agricultural with several clusters of houses and barns occupying the site. On Olive Avenue there was a warehouse facility which is known to have been a mill.

In two 1942-1943 photographs (Figures A-2 and A-3), Hewlett Packard's "Redwood Building" and the Quonset Hut, the current Buildings 7A and 7D respectively, had been constructed. The back of Building 7A had a canopy area. East of 7D is a small fenced area which marks the boundary of the HP property at that time. Immediately east of Hewlett Packard, two sheds had been constructed. Further east, the mill yard has been fenced in and apparently expanded. Residential housing was constructed on Olive Avenue. East of the mill there appears to be a burned area of farmland.

The 1949 Sandborn map (Figures A-4a and A-4b) shows Hewlett Packard's facility to include the present Buildings 7A, 7B, 7C, and 7D. Under the canopy between 7A and 7D, spray paint and welding operations were indicated. Several buildings were indicated to be in the southeastern portion of the block, east of the extension of Pepper Avenue, including a building supply yard, a shed, a building supply yard shed, the mill, and houses. The building supply yard shed was later used by Hewlett Packard as a flammable material storage area. On the mill property, a rectangular shed (part of the future Building 7F) had been built and a gas pump was indicated on the south side of the mill building.

A regional photograph from 1951 (Figure A-5) shows all buildings to be as in the 1949 Sandborn map. The northern half of the present Hewlett Packard parcel was still either residential or agricultural in use.

A photograph from 1951 to 1952 (Figure A-6) shows a new domed roof building constructed adjacent to the building supply yard shack. This building was in the location of the future HP Building 7G. This building appears not to be owned by Hewlett Packard at this point in time. The mill property had several sheds constructed along Olive Avenue and one large shed just northeast of the mein mill building. There were a number of small storage sheds constructed along the eastern fence of Hewlett Packard's property line (the extension of Pepper Street). Homes and barns still existed at the southern corner of Page Mill Road and Park Street.

In the aerial photograph reviewed from the period 1954 to 1956 (Figure A-7), HP Building 8 was constructed immediately east of Building 7C. Buildings 7B and 7C had an annex constructed on the back of each building. The homes and barns on the southern corner of Page Mill Road and Park Street were replaced by a parking lot. The western corner of Olive Avenue and Park Street was also a parking lot. Several large sheds were constructed adjacent to the domed roof building. These sheds appear to be part of a Hewlett Packard area for company and loading truck parking, as indicated on a facility diagram from approximately 1956. The mill building has been demolished. A non-Hewlett Packard building has been constructed just east of Building 7D.

A regional photo from 1958 to 1959 (Figure A-8) shows the same configuration as previous buildings. The original Building 7E has been constructed.

In 1960, a regional aerial photograph (Figure A-9) shows Hewlett Packard as occupying the entire site except the lot immediately east of Building 7D (this lot has two main buildings and a shed on it in the photo) and one residential lot on Olive Avenue, southwest of Building 8. Buildings 7A, 7B (with annex), 7C (with annex), 7D, 8, the domed roof building and flammable storage shed were unchanged. The original 7E was expanded with a large annex. A long shop was added to the old 7F building to form an L shaped building along Olive Avenue and Ash Streets. A maintenance or storage building and yard area was located just west of 7F (on the site of the demolished mill building).

In 1970, a local aerial photograph (Figure A-9) showed a sloped roof Building 7G to have replaced the domed roof building and the flammable storage shed. Hewlett-Packard had acquired the residential lot on Olive Avenue, but not the lot immediately east of Building 7D. All other buildings were the same as the 1960 photograph.

Building 12 was constructed in 1975. City of Palo Alto records indicate that by 1975, Hewlett Packard had acquired the entire block. In December 1975, permits were submitted to demolish buildings 7E, 7F, 7G, the maintenance/storage building west of 7F, and the two buildings just east of Building 7D. Demolition was performed in early 1977.

HISTORY OF CHEMICAL USAGE AT
395 PAGE MILL ROAD

BUILDINGS 7A AND 7D

Buildings 7A and 7D were constructed in 1942 and occupied in 1943. All Hewlett-Packard operations at that time were housed in these buildings. The Hewlett-Packard product line in the 1940's consisted of audio oscillators, audio signal generators, harmonic analyzers, square-wave generators, and vacuum tube voltmeters.

In the 1960's and 1970's, chemical mill (etching) operations, a laboratory, a semi-conductor shop, and a photo-conductor shop were reported to have occupied Building 7A. The location of these operations within Building 7A, length of time in use, and chemical usage associated with these operations is not well documented.

Information obtained from a Hewlett-Packard memorandum indicates that the chemical mill operation consisted of a metal etching process whereby metal parts were photosensitized and exposed to light. Associated with the chemical mill operations were two underground tanks. One was an approximately 1,000-gallon holding tank and the other a 500-gallon concrete clarifier sump, both of which were located adjacent to the Ash Street side of Building 7A (Figures 2 and 3). The holding tank is reported to have received all concentrated wastes and rinses from the chemical mill area which were periodically removed by Industrial Tank (IT), a waste hauler. A failure in the lining of the holding tank was reported to the manufacturer in June 1974. The tank was cleaned and recoated in July 1974. The tank is reported to have been removed in 1981. It is not known whether soil samples were collected.

The less concentrated rinses and miscellaneous wastes generated in this building are reported to have been washed down the drain, through the clarifier tank and into the sewer. In the early 1970's, violations in pH and copper concentrations were reported in effluent discharged to the city sewer from Building 7A operations. The concrete clarifier tank was removed in July 1986. No detectable concentrations of volatile organic chemicals were found in soil samples collected directly beneath the tank at six feet below grade.

Current operations housed in Building 7A include a model shop, facilities offices, and a model paint booth. A Hewlett-Packard memorandum from 1982 estimated that five gallons per week of waste solvents are generated from these operations. These wastes include acetone, MEK, lacquer thinner, alcohol, and methylene chloride. The Hazardous Materials Management Plans (HMMP) for 1982 to 1989 supplied by Hewlett-Packard to the Palo Alto Fire Department (PAFD) were reviewed and indicate that a flammable storage cabinet in the south end of the model shop stores flammable solvents and paints, and casting resins which contain isocyanates. The fenced storage area adjacent to 7A houses paints and flammable polyurethane paints. The enclosed storage building south of 7A houses a variety of cleaning products, such as disinfectants and floor finishings. This building was used for hazardous material storage prior to 1984. A 90-gallon propane tank is located on the northeast side of Building 7A. A group of transformers including one transformer identified as contaminated with polychlorinated biphenyls is located north of 7A. Current and historical chemical use areas for Building 7A are shown in Figure 2 and described in Table 1.

Building 7D was constructed in 1942 and housed the original foundry and die cast operations. Vehicle repair activities were conducted in this building when the die cast operations moved to Building 7E in the late 1950's. One aerial photo from the late 1950's showed 55-gallon drums stored adjacent to the south wall of 7D. Two above ground fuel pumps and several 55-gallon drums were observed approximately 40 feet north of Building 7D in an aerial photo from the late 1950's. No other records pertaining to chemical usage, storage, or disposal were available for this building prior to 1982.

Building 7D is currently used primarily for storage and as a fork lift repair area. HMMP records for 1985 to 1988 indicate that oxygen, acetylene, and argon cylinders are stored here. In addition, one small portable degreasing station and less than 50 gallons of paint, and contact cement have also been reported to be stored in this building. Chemical use areas in Building 7D are shown in Figure 3 and described in Table 1.

BUILDING 7B

Building 7B was constructed in 1948 and housed a machine shop, a model shop, a brite-dip line, riveting and silkscreening operations, an assembly area, and grinding, welding, sanding, soldering, and painting facilities. In the early 1970's this building housed all of the above and a printed circuit shop. Since 1975 this building has housed the Corporate Color Labs, a paint area, a machine maintenance area, a milling area, silk screening and developing processes, grinding, welding, trimming and riveting operations, and an assembly area.

Two sumps are located adjacent to the eastern end of Building 7B. One of these sumps is reported to drain to the city sewer and one is reported to contain valves for the fire system.

Palo Alto Fire Department records (HMMP) from 1985 to 1989 and a Hewlett-Packard memorandum from 1982 indicate that solvents, lacquer thinners, silk screening inks, miscellaneous oils, and paints have been used in this building. In the welding room, cylinders of argon, oxygen, and acetylene are stored. Quenching oils are also located in the welding room.

The Corporate Color Lab consists of a storage area, paint booth and oven, a bench-top lab area and offices. Water-based and solvent-based paints, inks, and small quantities (less than 50-gallons) of thinners and solvents are stored and used in the Corporate Color Lab area. Approximately five

TABLE 1

CHEMICAL USE AREAS - BUILDINGS 7A AND 7D

LOCATION	DESCRIPTION	CHEMICALS	DATES OF OPERATION
7A-1	Paint booth, sump, sinks, storage area	Solvents, paints, and casting resins	Unknown - Present
7A-2	Transformer	Polychlorinated-biphenyls (PCBs)	Unknown - Present
7A-3	Holding tank	Alkaline and acid solutions	Unknown - Present
7A-4	Former chemical milling operation	Alkaline and acid solutions	Unknown - 1970's
7A-5	Former photo and semi-conductor production operations	Unknown	1961
7D-1	Storage area between Building 7A and 7D	Polyurethane paints cleaning products	1943 - Present
7D-2	Former concrete clarifier	Alkaline and acid solutions	Unknown - Removed in 1986
7D-3	Former gasoline pump and drums east of building 7D	Gasoline and diesel	1950's and 1960's

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gallons of waste solvents are reported to be generated every two months, paint sludge is removed in approximately one 55-gallon drum of waste yearly.

Several small, mobile TCA degreasers are located in Building 7B. Approximately 5 gallons of waste solvent are reported to be generated from these degreasers per month.

A storage area located between Buildings 7B and 7C houses freon gas cylinders, acetylene, and nitrogen gas cylinders. In addition, campella oil, sodium nitrate, and Freon 113 are stored in this area.

Chemical use areas in Building 7B are described in Table 2 and shown in Figure 4. A description of chemicals used in the printed circuit shop process baths showing the plating line arrangement is included as Appendix B.

According to the ESI report of 1970, the major sources of waste water at the 395 PMR facility originated in Building 7B from the printed circuit area (plating), the bright dip area, and two paint booths, each with 200 gallon paint reservoirs. As of 1970, all waste water from the 395 PMR facility received no pretreatment and was discharged directly into the City sewer on Ash Street.

BUILDING 7C

Building 7C was constructed in 1948 and housed the Dymec division of Hewlett-Packard. The Dymec division produced integrated digital voltmeters and scopes which were used to measure low level analog signals. All Dymec operations, including aluminum parts production, testing, assembly and wiring, and shipping and receiving were conducted in Building 7C.

Since the mid-1960's Building 7C has primarily housed plastics molding operations and a limited amount of sheet metal fabrication and painting. Quality assurance testing and shipping and receiving are still located in Building 7C. Two groups of transformers are located inside Building 7C.

A Hewlett-Packard hazardous material survey form dated 1982 indicated that paints, thinners, aqueous ammonia, plastic pellets, polonium (anti-static air guns) and liquid and gaseous nitrogen have been stored in Building 7C. Chemical use in Building 7C is currently limited to storage of less than 25 gallons of solvent in the plastics molding shops, and paints and metal sprays in the metal spray booth. Lead and/or zinc paint mixtures are used to coat plastics in the metal spray booth. Chemical use areas in Building 7C are described in Table 2 and shown in Figure 5. No underground or aboveground storage tanks or sumps were identified in the vicinity of Building 7C.

TABLE 2

CHEMICAL USE AREAS - BUILDINGS 7B AND 7C

BUILDING/LOCATION		DESCRIPTION	CHEMICALS	DATES OF OPERATION
7B	7B-1A/1B	Sumps on east side of Building 7B	Acids, bases, metals, and wastewater	1948 - Present
	7B-2	Former plating line	Acids, bases, and metals	1948 - 1976
	7B-3	Former brite-dip line	Acids, bases, and metals	1948 - 1976
	7B-4	Corporate Color Lab	Paints, solvents, and thinners	1948 - Present
	7B-5	Silkscreen booths	Dyes and Inks	1948 - Present
	7B-6	Developing room tanks	Hydrogen Peroxide	Unknown - Present
	7B-7	Former machine shop	Oils and solvents	1948 - 1976
7C	7C-1	Metal spray room	Metals - lead, zinc Paints and solvents	Unknown - Present
	7C-2	Former aluminum part production	Solvents, acids, bases, and unknown chemicals	1970

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BUILDINGS 7E, 7F, AND 7G

Buildings 7E, 7F, and 7G were constructed in the early 1960's. An environmental impact assessment for the demolition of 7E, 7F, and 7G was filed with the City of Palo Alto on June 18, 1975. Figure 6 shows the locations of Buildings 7E, 7F, and 7G. Building 7E housed the die cast operations, which included a foundry, and drilling and machining operations. No floor plans, process diagrams, or chemical use information were available for 7E. Palo Alto Fire Department records indicate that Building 7F housed a welding and carpentry shop and also served as storage for custodial and maintenance supplies. No information on chemical use in Building 7F was available.

Building 7G was described as the Hewlett-Packard Associates Division on a 1961 plant map. The Hewlett-Packard Associates Division was involved in solid state research, development, and manufacturing. The 1970 ESI report described Building 7G as a machine shop, and employees interviewed remembered 7G as either a paint shop or a storage area. One blueprint for Building 12 construction showed a sump on the north side of Building 7G.

An open air flammable storage shed is reported to have been located southwest of Building 7G. No information on the types or amounts of chemicals stored was available. No record of any spills or releases was found.

BUILDING 8

Building 8 was constructed in 1954. Hewlett-Packard plant diagrams from approximately 1956 and 1961 indicate that offices and limited bench-top research and development laboratory operations were housed in this building. A group of transformers is located outside of Building 8.

In April 1987 excavation activities around the fire main between Buildings 8 and 12 revealed discolored backfill material. Soil samples were collected which indicated that stoddard solvent/mineral spirits were present in the sample at a concentration of 6,700 parts per million (ppm). Additional excavating and sampling was conducted to define the limits of contamination. All contaminated material encountered was removed from the site.

BUILDING 12

Construction of Building 12 and the chemical storage shed was completed in 1976. Building 12 (upper) houses sheet metal fabrication, brite dip and iron phosphate lines, paint booths and mixing areas, an aluminum foundry, and aluminum die casting and fabrication operations. Building 12 (lower) was constructed below grade and houses an aluminum scrap recovery operation, a waste water treatment facility, building heating, air conditioning and ventilation (HVAC) systems, and above ground solvent and waste oil tanks. Four 12,000-gallon underground diesel fuel storage tanks are located in an underground vault adjacent to the north side of Building 12.

The brite dip line in Building 12 is a chromic conversion process which utilizes alkaline cleaners, sodium hydroxide de-oxidizers, sulfuric acid de-smutters, and chromic acid corrosion preventors. The iron phosphate line utilizes cleaners, iron phosphate solutions, and an ultra rinse solution. Both of these lines are located in 12 upper, rest on a raised concrete pad, and have pipe trenches all around them which transport waste and/or spills to the waste water treatment facility in Building 12 lower. A large, stationary TCA degreaser is located in a pit in the central portion of Building 12 and several small, self-contained degreasing stations are located throughout the machining areas. The large stationary TCA degreaser currently located in Building 12 upper contained TCE prior to 1987. Another degreaser was located in Building 12 upper which contained PCE; this degreaser was located in the vicinity of the brite-dip line and was removed in 1986. No sampling was conducted during removal, however the concrete pad was inspected and appeared to be free of cracks.

Paint preparation and mixing areas and spray booths are located in the western portion of Building 12 upper. The aluminum foundry and die cast machines are located in the eastern portion of Building 12. Lubricating and cooling oils are used in machinery throughout Building 12. The majority of these oils are recycled and only small amounts of particulate contaminated oils and sludges are disposed of off-site. Large vacuum units collect grit and dust at each machine and recycle metal particulates. Aluminum dust that remains in vacuum units is disposed of off-site.

Four caustic die wash tanks and two solvent tanks are located in the die repair area of Building 12. Wastes from these caustic tanks is piped to the waste water treatment facility in Building 12 lower. Four approximately 12,000-gallon underground diesel storage tanks are located on the north side of Building 12. These tanks were installed in 1976 to run the boiler but are currently empty and are scheduled for removal. All of these tanks are located within a secondary containment vault.

The waste water treatment facility in Building 12 lower consists of several tanks which are used to neutralize and store waste. Treated waste water is discharged to the Olive Avenue sanitary sewer. The floor area is bermed and coated and a floor sump pumps all waste water from Building 12 into a holding tank prior to treatment. Two dewatering sumps are located in Building 12 lower, one inside and one outside. The floor level of Building 12 lower is below groundwater levels and these sumps are part of a french drain system around the basement of Building 12.

A 1,500-gallon waste machine oil and water tank is located in the southern portion of Building 12 lower. The tank is in a coated, bermed containment area. The HVAC system, boiler room, and elevator access/maintenance area are located in the northern portion of the basement. A die vacuum system and scrap metal conveyer belt are located along the eastern wall of the basement.

The exterior portion of the Building 12 basement houses two above-ground solvent tanks in a bermed, coated containment area. These tanks contain waste and virgin solvents. Prior to 1987 these tanks stored PCE; they currently store TCA solvent. Five vacuum metal dust collection units are located in this area of the basement. Fifty-five gallon drums are placed beneath these units to collect waste particulates. An emergency generator is also located in the exterior basement. Chemical use areas in Building 12 are described in Table 3 and shown in Figures 7 and 8.

CHEMICAL STORAGE SHED

The chemical storage shed was constructed in 1976. The shed is approximately 2,000 square feet in area and is divided into four sections. The four sections house waste materials, virgin bulk materials and paints. Chemicals are delivered to one section of the shed and segregated for distribution throughout the facility from another section. The paint storage section of the shed houses two double-contained 500-gallon above-ground tanks which are used to store used Trimsol (a water soluble petroleum based cooling oil) and recycled Trimsol. The Trimsol is filtered by an off-site contractor, solids removed and disposed of off-site, and the remaining Trimsol is stored in one of the tanks for re-use at the facility.

Acids are stored in a special containment shed adjacent to the north exterior wall of the chemical storage shed. A variety of solvents, oils, paints (water soluble and solvent based), and bases are stored in the chemical storage shed. The HMMP for 1987 indicates the following chemicals are stored: argon, helium, oxygen and acetylene cylinders, acetone, toluene/lacquer thinner, vinyl texture, MEK, petroleum paraffins, petroleum naphtha, petroleum hydrocarbons, mineral oils, 1,1,1-TCA, aluminum and steel powders and sludges, sodium hydroxide, hydrofluoric acid and paints.

TABLE 3

CHEMICAL USE AREAS - BUILDING 12

BUILDING/LOCATION		DESCRIPTION	CHEMICALS	DATES OF OPERATION
12 Upper	12U-1	Paint preparation booth and mixing areas	Paints and solvents	1976 - Present
	12U-2	Phosphate line	Acids, bases, and metals	1976 - Present
	12U-3	Brite-dip line	Acids, bases, and metals	1976 - Present
	12U-4	Degreaser	1,1,1-TCA	1976 - Present
	12U-5	Caustic and solvent tanks	Caustics and solvents	1976 - Present
	12U-6	Paint room and booth	Paints and solvents	1976 - Present
	12U-7	Die casting shop	Metals, oils, and diesel	1976 - Present
	12U-8	4 underground diesel tanks	Diesel	1976 - Present
	12U-9	Degreaser	Perchloroethylene, TCA	1976 - 1987
12 Lower	12L-1	Waste treatment facility	Acids, bases, solvents, oils metals	1976 - Present
	12L-2	Waste oil tank	Waste oil	1976 - Present
	12L-3	Sump from floor drains in Building 12	Solvents, oils and metals	1976 - Present
	12L-4	Solvent Tanks	Solvents	1976 - Present
	12L-5	Boiler Room	Oils	1976 - Present

SURROUNDING FACILITIES WITH DOCUMENTED CHEMICAL LEAKS OR SPILLS

Potential sources of chemicals which may have contributed to groundwater contamination within a one-half mile radius of the 395 Page Mill Road site have been identified. Information about facilities having documented histories of chemical leaks or spills was obtained by reviewing the Fuel Leak List dated March 29, 1989 and the South Bay Site Management System Quarterly Report dated October to December, 1988. Both lists are published by the Regional Water Quality Control Board (RWQCB). Information obtained from the agency list review is summarized in Table 4. The facility locations are shown on Figure 9. Sites shown on these lists are those with known significant contamination. Other sites in the area may have had past problems which have been remediated, have not yet been identified, or have small amounts of contamination not likely to impact the subject site. The shallow groundwater flow direction in the general area is to the north or northeast and is heavily influenced by pumping at the Oregon Expressway Underpass, adjacent to the 395 PMR facility. Several facilities are located in an upgradient direction from the 395 PMR facility, including DuraBond Bearing Company, Palo Alto Nissan, Jost Heating and Air, Stanford Cleaners, Kodak, and Varian Associates.

Aerial photographs and maps were reviewed for land use patterns in the vicinity of the 395 PMR facility. The results of this review are summarized below.

In the 1941 regional photograph (Figure A-1), the general land use of the future Hewlett Packard site was primarily agricultural. To the south, mixed residential and agricultural uses existed. To the north, several warehouses existed. To the west, medium density single family residences had been constructed. To the east, Southern Pacific railroad tracks and a large industrial complex (on Portage Avenue) were in place. Mayfield School can be seen on El Camino Real.

In the 1949 Sandborn map (Figures A-4a and A-4b), several warehouses exist to the north across Park Street from the 395 PMR site. These include a tire, furniture, and paper warehouse, a feed mill and fuel storage company, a water softener company, and a company called Metalead Products. The mill on Olive Street, directly east of the Hewlett Packard site, was listed as having a gas pump. To the east on Portage Avenue, land uses included motor and truck repair, food storage, bearing manufacturing, and spray painting. Fuel oil tanks were shown between Park Street and the railroad tracks at the foot of Olive Street. A dry cleaning establishment, a transformer manufacturing company, and an auto repair facility existed on Olive road between Ash Street and El Camino Real. A sign painting establishment was listed at 420 Page Mill Road.

TABLE 4

SURROUNDING FACILITIES WITH DOCUMENTED CHEMICAL LEAKS OR SPILLS

FACILITY	LOCATION	SOURCE	STATUS/LEAD AGENCY	CONTAMINANTS
Hewlett-Packard Company	640 Page Mill Road	Underground Tank	Active RWQCB	TCE, TCA, and DCE
Stanford Cleaners	2875 El Camino	Underground Tank	Inactive RWQCB	Stoddard Solvent, 140 F Solvent, Trans-1,2-DCE, and TCA
Varian Associates	611 Hansen	Sumps and Drums	Active DHS	TCE, TCA, 1,1-DCA, PCB, Oil and Grease, (other solvents
Varian Associates	601 California Ave.	Underground Tanks	Active RWQCB	TCA, TCE, 1,1-DCE
Aydin Corporation	3180 Hanover	Underground Tank Barrel and Tanks	Active DHS	PCB's, Hydrocarbons, TCA, TCE, DCE, DCA, Methylene Chloride, Chloroform, Penta Chlorophenol, (other solvents)
Dura Bond Bearing Company	3201 Ash Street	Pond, Underground Tank	Inactive, RWQCB	TCE, DCE, DCA, Toluene, Ethyl Benzene, Xylenes, and Petroleum Hydrocarbons, Stoddard Solvent
Alza Corporation	950 Page Mill Road	----	No Action RWQCB	1,1-DCA
Beckman Instruments	1050 Page Mill Road	----	Inactive RWQCB	----

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TABLE 4

SURROUNDING FACILITIES WITH DOCUMENTED CHEMICAL LEAKS OR SPILLS
(continued)

FACILITY	LOCATION	SOURCE	STATUS/LEAD AGENCY	CONTAMINANTS
Page Mill Chevron	775 Page Mill Road	Underground Tank	Active RWQCB	Waste Oil
Palo Alto Nissan	3001 El Camino Real	Underground Tank	Active RWQCB	Diesel and Kerosene
Royal Glass	450 Cambridge	Underground Tank	Active RWQCB	Gasoline
Jost Heating Shaet Metal	412 Olive	Underground Tank	Active RWQCB	Gasoline and Hydrocarbons
Holvack	216 Page Mill Road	Underground Tank	Active RWQCB	Fuel
Bleiber Iron	411 Page Mill Road	Underground Tank	Active RWQCB	Fuel
Vance, Brown and Sons	2747 Park Boulevard	Underground Tank	Active RWQCB	Fuel
Shell	2200 El Camino Real	Underground Tank	Active RWQCB	Fuel
Page Mill Mobil	2780 El Camino Real	Underground Tank	Active RWQCB	Fuel

RWQCB - Regional Water Quality Control Board
DHS - Department of Health Services

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In a limited area photograph from 1951 to 1952 (Figure A-6), the Beilber Ironworks had been constructed directly across Ash Street from the Hewlett Packard Building 7A. The mill on Olive Street had expanded significantly and the sign painting company's Quonset hut can be seen on Page Mill Road.

The regional photograph from 1951 (Figure A-5) shows the construction of College Terrace and Baron Park residential parks to the south. The area along Page Mill Road south of El Camino Real was still primarily agricultural. Areas north, east, and west were largely residential except for the industrial areas previously noted.

In the 1958-1959 regional photograph (Figure A-8), development of Stanford Research Park had begun. Varian Associates on Hansen Way, Eastman Kodak and Hewlett Packard on Page Mill Road, Lockheed Missiles and Space Company and Aydin Energy Corporation on Hanover Way, and various smaller facilities on California Avenue can be identified.

In summary, numerous facilities are located in the vicinity of the 395 PMR site which have documented chemical spills or leaks. There are 17 facilities within a one half mile radius of the 395 PMR site which have known contamination in the soils and/or groundwater as documented on RWQCB Fuel Leak and Toxics lists.

SUMMARY

Information obtained from record reviaws, employee interviews, previous reports, aerial photographs and site visits have revealed the following information regarding areas of historical and current chemical usage at the 395 PMR facility.

Chemical use areas identified in Building 7A currently include a paint spray booth and storage area, a PCB contaminated transformer located between Buildings 7A and 7B and a storage area between Buildings 7A and 7D which historically housed hazardous materials. In addition, Building 7A historically housed chemical milling operations and a photo conductor, semi-conductor production areas. Historical photographs indicated that the area immediately east of Building 7D housed several 55-gallon drums. The same photograph revealed that two gas pumps and two 55-gallon drums were located approximately 40 feet east of Building 7D.

Building 7B historically housed the following chemical use areas, a plating line, brite-dip line, machine shop and paint shop. Two underground sumps are located on the east side of Building 7B. Building 7B currently houses silkscreening, film developing and painting areas.

Chemical uses in Building 7C include a metal spray room and a paint spray booth. Historically, Building 7C housed an aluminum part production and test area.

Chemical use areas in Buildings 7E, 7F, and 7G were not well documented; Building 7E housed the foundry and die cast operations, Building 7F housed a carpentry and welding shop, and Building 7G is reported to have been used as a machine shop, paint shop, and storage area.

Building 12 chemical use areas include the brita-dip and iron phosphate lines, degreasers, caustic and solvent tanks, paint booths and mixing areas, and die cast machinery.

Building 12 (upper) houses various types of machining operations, many of which require oils for lubricating, cooling, and maintenance. Housekeeping in this building is good and the bulk of chemicals used here are treated or recycled. Four underground diesel storage tanks in a vault are located north of Building 12.

Chemical use areas in Building 12 (lower) include the waste water treatment facility, waste oil and solvent tanks, a boiler room and a sump which collects waste water from floor drains in Building 12 and pumps to the waste water treatment facility.

DESCRIPTION OF PRINTED CIRCUIT SHOP
PROCESS BATHS BUILDING 7B (PALO ALTO PLANT)
COURTESY OF ENGINEERING SCIENCE, INC., 1970

Tank No.	Contents
1	Alkaline Cleaner Shipley Co. (Mass.) 1175 Conditioner
2	Soft Water
3	Ammonium Persulfate 2 lbs/gal (45 gals)
4	Soft Water
5	10% vol. H_2SO_4
6	Soft Water
7	Soft Water
8	30% Vol. Reag. HCl
9	30% Vol. Reag. HCl
10	Catalyst 9F (Shipley Co., Mass.) Sn^{+2}, Sn^{+4}, Pd^{+2}, HCl H_2O
11	D. I. Water
12	Soft Water
13	Soft Water
14	Accelerator 19 (Shipley Co., Mass.) Acid Base
15	Soft Water
16	D. I. Water
17	Cupsit 357 (Shipley Co., Mass.) $CuSO_4$, NaOH, Formaldehyde
18	Soft Water
19	5% Vol. H_2SO_4
20	Soft Water
21	D. I. Water
22	Alkaline Cleaner (Metex-T-103) McDermid Co.

DESCRIPTION OF PRINTED CIRCUIT SHOP
PROCESS BATHS BUILDING 7B (PALO ALTO PLANT)
COURTESY OF ENGINEERING SCIENCE, INC., 1970

Tank No.	Contents
47	Soft Water
48	Soft Water
49	264 N gold Strike (Selrex Corp., Nutley, N.J.)
50	Soft Water
51	D. I. Water
52	BDT 200 Gold Plat (Selrex Corp., Nutley, N.J.)
53	Gold Reclaim Tank Non Circulating
54	Soft Water
55	Soft Water
56	D. I. Water
57	Alkaline Etchant AE 25 (Southern California Chemical Co.)
58	Soft Water